Volume I.] *January, 1892.* [*Number 1.*

SCHOOL AND COLLEGE.

SOME OF THE NEXT STEPS FORWARD IN EDUCATION.

IN one point the observations which follow will be somewhat lacking in unity. Part of them will relate especially to the work of universities and colleges, part to that of high and intermediate schools, and part to primary teaching. But the business of education is in effect one, so that a certain integrity will, after all, characterize what is offered. Let no one, from the title of the article, infer that its author supposes the educational movement which he is to discuss to be all in the future. Some of its steps are in places partly, perhaps wholly, taken already. Elsewhere teachers and school authorities are poising, all ready to take them. Reforms always move slowly at first, and most slowly of all in affairs of the immaterial life, where they are not indispensable to mere animal existence. "But humanity sweeps onward," and any stream of tendency which actually belongs to its advance is sure to flow more swiftly as it cuts for itself a deeper and deeper channel, till the rill becomes an Amazon, carrying everything before it.

Foremost among the items of educational progress to which attention is invited, is a new conception of the nature and ends of education, new to some in omitting certain elements, to others in introducing elements, to others in relative emphasis of the elements recognized by all.

Speaking succinctly, the constituents of a sound education are first, character; second, culture; third, critical power, including

accuracy and also sympathy with all the various ages, nationalities, and moods of men; and fourth, power to work hard under rule and under pressure.

We see that here mere knowledge is left out of the account. It is quite incidental and relatively insignificant. Yet this is what most people have been wont to regard as the sum and substance of education. We see, too, that the question what studies are to be pursued is not mentioned, although many continually place it first. It is not unimportant. It would be pleasant to go into it deeply. Were we to do this, however, we should not enter the lists for the classics on the one hand, or for the sciences of nature on the other, but should urge rather the propriety of giving a much larger place in the curriculum than has ever been given hitherto, to the political sciences. But the structure and material of the curriculum is not to-day the most pressing educational question.

The definition makes character part of education, and even gives it the first place. All reflecting persons are coming to feel that unless schooling makes pupils morally better, purer within, and sweeter, kinder, stronger in outward conduct, it is unworthy the name.

Culture comes next, by which is meant the power to apprehend and relish the beautiful in conduct, in art and literature, and in nature. Education must enrich life, not enlighten it merely. Culture stands in importance close to character, to which it is also very intimately related in essential nature, and it is far more to be sought than mere mental ability.

Third comes critical power, and mainly in the two great elements of accuracy and sympathy. Memorable ever is the thought of Cardinal NEWMAN, that the principal part of a good education is accuracy. That one's mind is full signifies nothing unless the contents are definite and analyzed. A little knowledge well grouped and ordered comes much nearer the ideal education than infinite funds lying unassorted in the mind like so much raw ore.

To be accurate requires that of many things a finite mind should deliberately remain in ignorance. To read all the books

relating even to a subject in which one is especially interested would be a positive disadvantage. Too much information in detail confuses the mind, confronting it with a blurred, indefinite picture, that can be of no service to it, instead of those clear, crisp, comprehensible outlines which are so valuable. Large newspaper reading is deleterious to clear thinking beyond perhaps any other of the numerous causes operative in that direction at the present day.

Accuracy must be accompanied by sympathy, the power to draw near to men of all the different ages, civilizations, and temperaments, knowledge of the race, of the world, and of God. Here is where the importance of historical study comes in. "There is one mind," says EMERSON, "common to all individual men. Every man is an inlet to the same and to all of the same. He that is once admitted to the right of reason is made a freeman of the whole estate. What PLATO has thought, he may think; what a saint has felt, he may feel; what at any time has befallen any man, he can understand. Who hath access to this universal mind is a party to all that is or can be done, for this is the only and sovereign agent." The true scholar must enter into this mind: the door to it is sympathy; the latch, history.

An important element of sympathy is freedom from prejudice; the power not to dismiss unstudied or contemned a view which at first sight strikes you as strange or even as false. This power is one of the very best tests of a truly educated man. If you cannot to a good extent feel with your opponent, you cannot duly weigh his argument; and without this your disputing with him will but saw the air.

With all these qualities must go self-mastery for each important purpose of life, the power to put and hold oneself to work, and to turn off large relays of intellectual or other work in a short time. This, too, is an essential ingredient in education.

A vast number of the people interested in education agree to nearly this view of its nature; yet many do not, and much zeal for education spends itself in vain because devoted to unworthy or comparatively unimportant ends. Specially universal and specially vicious is the heresy that education is mental only.

No very satisfactory progress is to be hoped for till a higher, richer, broader notion prevails.

Another reform, introduced but only begun to be carried out, is the establishment of right relations between teacher and pupil. They need to come nearer to one another. Many of our primary schools are already about models in this, but in higher forms a great gap between teacher and taught still yawns. They ought to approach each other closer in what I may call an ethical way, as well as in an intellectual way.

We need, more than we have as yet done, to get upon a level of friendship with our pupils, not standing off from them, not looking down upon them. Present yourself to your pupils as their guide, friend, adviser, elder brother, — one who, having the advantage of age and larger study, is able to assist them. The *in loco parentis* idea of the teacher's office is sometimes urged as an argument in favor of pedagogical sternness and severity. Not so. Parental authority itself is no longer exercised in the old way. How many civilized fathers horsewhip their boys nowadays? In the lower grades, and to an extent in all, authority must exist, but it should be kept so much as possible in the background. Never coerce a pupil save as a last resort.

Kindness to pupils is never exercised in vain. Strive by unselfishness and perfect uprightness to make your pupils regard you the finest man on earth. To this end, do not assume infallibility, but, if mistaken ever, admit it. Be an original thinker, an authority in your department, no mere expositor of a book; yet if you pretend never to err, your dullest scholar knows better and puts it to your discredit.

Never use sarcasm toward a pupil or make fun of him. You are a coward if you do, taking advantage of your position to enable you to hurt a fellow-being as good as yourself, and you will be despised as a coward deserves. But worse, when you treat a pupil so, you can teach him little more. The inclination on that learner's part to question you is gone forever, and has given way to timidity, or perhaps to a sullenness or obstinacy, which you can never overcome.

Quite as important as this ethical approach is it to breed in the student the living conviction that he is essentially your peer intellectually. You possess the powers of mind; so does he. He, too, was made to be a thinker. All the problems of life and science are open to him. He is as free to search into nature as DARWIN was. The Creator has perhaps called him too to be a great interpreter of truth to mankind. At any rate, he is not merely to learn about the world for himself; he is to teach his fellows something. Make him aware of his high calling in this regard. Most educators fail here. They do not feel this truth even respecting themselves. To be able to say, "I think God's thoughts after Him, — yes, perhaps some new thoughts that no mortal ever thought after Him but I" — ah! there is inspiration in it. Your slow boy, shy, a bad speller, mayhap, he, too, is a product of the Divine Spirit, with some originality at any rate, possibly cut out for a LAPLACE or an EDISON. Make him feel that, and you have done a great deal towards educating him.

Our best way to magnify our calling, which is important, is not to act as if we thought ourselves a class of beings apart, but to throw ourselves into our work with indomitable zeal. "Where the masters," says ADAM SMITH, "really perform their duty, there are no examples, I believe, that the greater part of the students ever neglect theirs. No discipline is ever requisite to force attendance upon lectures which are really worth the attending, as is well known wherever any such lectures are given. Force and restraint may, no doubt, be in some degree requisite in order to oblige children or very young boys to attend to those parts of education which it is thought necessary for them to acquire during that early period of life; but after twelve or thirteen years of age, provided the master does his duty, force or restraint can scarce ever be necessary to carry on any part of education. Such is the generosity of the greater part of young men, that so far from being disposed to neglect or despise the instructions of their master, provided he shows some serious intention of being of use to them, they are generally inclined to pardon a great deal of incorrectness in the per-

formance of his duty, and sometimes even to conceal from the public a good deal of gross negligence."[1]

Our next thought is upon thoroughness, and relates more to education in its upper walks. If higher education is to be thorough, it must give large play to the elective system of studies. The old college curriculum made real thoroughness well-nigh impossible. It forced pupils to be smatterers, because, just so soon as a student got introduced to a subject, it rushed him forward to commence in the same superficial way something else, and so on to the end. He might know a little about many things; much he could never know of anything.

But to utilize elective instruction, we must have an elective system, not an elective chaos. The studies taken by any student must be naturally allied, so as each to aid the others in aiding the mind. If you jump from United States history to natural history, thence to art, thence to the calculus, you will be worse off than by the cast-iron curriculum. It is found, however, that surprisingly few make these foolish choices.

Again, an elective system will work mischief if a pupil is launched upon it before he is intellectually of age. There are certain studies highly needful to our mental build, which are to most pupils irksome. They include mathematics, logic, and the elements of philosophy. Without going the length of the pedagogical theorists who speak continually of a "rounded" education, the writer is forced to believe that the branches just mentioned will be greatly missed in any man's mental growth unless made familiar early. But those most certain to need them are the most certain to neglect them if permitted. We must not, even in the conservative way spoken of, turn our pupils adrift too soon.

The benefits springing from election when the mind is ripe for it, are vastly beyond what its foes will admit, and even greater than many of its friends think. One is the advantage of unity. You notice that graduates and adult students, whatever their intellectual callings, always study, if they are per-

[1] Wealth of Nations, Book V, Chap. I.

mitted, one thing at a time. A lawyer finishes a particular case before he begins another and before he undertakes any collateral study. A minister will not, unless forced to, pursue any concurrent investigation while making a sermon. Whenever we are obliged to think seriously upon two or three subjects at the same time, much force is lost. If this is the case with adult minds, how much more with pupils not yet mature. It is a grave question whether we do not err even in prescribed work, by forcing classes to carry along too many studies at once. Would it not be better to break the back of the preparatory mathematics, for instance, by itself, no other study being in hand at the time? And in beginning a given language, would it not be wise to lay all else aside till the rudiments are fully mastered? Such a course would certainly have much in its favor, though evils would attend it as well, and might preponderate.

Now, the elective system of studies — system, mark the word — has this great advantage of unity. One subject is before the mind all the time. Not a narrow subject, of course — at least, it should not be; a generic one, rather, yet *one*, with its different sides and phases so connected that each will aid to grasp the others. This is a measureless help.

But it is not the only help, and perhaps not the greatest. With it works the principle of enthusiasm. This arises not merely from the joy natural to the mind that is let go in its own track, to the boy permitted to skip what he hates and bidden to take up what he relishes, but from the joy of knowledge itself, of attainments, of mastery. The bright pupil, given free rein in an elective system, choosing as his main subject chemistry or physics, biology or history, soon comes to know something, actually to know it, not to guess at it, not to have been told it, not to have read it out of a book, — very likely to know a little something beyond or better than any one else on earth. Infinite delight attends such an achievement, and he who has once tasted joy of that sort will never lack for intellectual spur. When you hear teachers complain of listless pupils, whining that hard work is getting less common,

that ball and boating and other diversions receive more energy than study does, inquire if here is not the remedy.

By emphasizing thus the importance of as large as possible, exact, exhaustive knowledge in some one field, we by no means intend to admit that this, so far as liberal education is concerned, is the ultimate end to be kept in view. Precisely herein, in fact, lies the difference of aim between liberal and technical study; that technical study primarily regards the object of knowledge, the mastery of certain facts, processes, and methods, while liberal learning regards the subject of knowledge, having ever in view the choice and roundabout furnishing of a human mind. My point is, that directly in this gymnastic exercise of mind, the deep and masterful grasp of some special department of fact is an indispensable instrumentality.

In saying that the old curriculum forced students to be inaccurate and shallow, we do not mean to imply that all graduates bore this character equally. Whatever your educational method, pupils will differ. In particular, results, under the best elective system, will vary according to your class-room procedure.

A vicious mode of handling your class will do very much to develop inaccuracy, more, perhaps, than a perfect curriculum can overcome. A recitation which is merely that, only a test to the pupil, embodying no instruction, is sure to promote superficiality. There is a knack of reciting, which many will acquire; a habit of mere glibness and parroting will follow, and the mind be turned away from real attainments. Here lies one of the teacher's chief temptations. We are forced to cherish rapid and fluent class exercises because they save us time, which is so precious. We are thus beguiled into treating, if not considering, those as the best scholars whose tongues wag the fastest in class. Next, our own ideas as to what a recitation should be become confused and faulty, the final result being that the appearance of attainments is substituted for attainments themselves, and that the pupil is actually aided by us to lose sight of his own real growth, only to be awakened, perhaps

too late, when, out in active life, he is called to match himself with those trained upon a more thorough plan.

In very large classes, or in schools of the lower grade, only relative accuracy and thoroughness are to be attained. We can do there only what we can do. Manual training in the common schools is having a splendid effect in this regard, so far as it goes. If it does not do all that its warmest advocates expect, it will impart exactness of apprehension as nothing else will. Yet, do our best, we cannot train very large classes with the desirable nicety. There is not the time to devote to each pupil. This is why private schools will for a long time be necessary to supplement public.

Another revolution soon to greet the educational world, is to consist in the introduction of certain educational methods and appliances which will greatly save labor and time.

It must be admitted that the average youth of eighteen in France or Germany is at least two years further advanced in quantity and quality of mental stores than his fellow of equal age here who has attended school quite as many months of his life. That this is an immense gain every one will see. It cannot be ascribed to extra native brightness in the European boy, or any considerable part of it to inherited aptitude for learning. The reason of it is that over there they teach better than we have learned to do, partly by introducing each several study at the right time, partly by securing a higher grade of teaching talent, especially for the lower classes, and partly by more scientific modes of opening and filling the mind, whatever the grade. We shall never catch up with Europe till we pay better salaries and higher honor to teachers, particularly in primary and introductory work, nor until we give more study to the science and art of teaching. When we are duly to awake to these things I do not know, but there are signs of some advance.

We are coming to see the terrible and needless loss suffered by neglecting studies like botany, mineralogy, physiology, and the elements of physics, till the pupil has passed the age of special observational power. The best schools now treat these

so early as ten or twelve. Their pupils come to college prepared to learn something, possessing not only the requisite rudimentary knowledge, but also the feeling for the work, that feeling which, if not awakened till eighteen or twenty, almost never comes at all. Here is an evil which colleges cannot remedy alone, for the reform is not the work of those preparatory years which colleges can reach. It must begin lower down.

Not only the times but the methods of teaching these branches are changing for the better. The laboratory, the demonstration, the note-book, field work, prepared specimens,—these are displacing the dry-as-dust old text-book, and bringing with them what is always so welcome, first-hand knowledge and the ability to be an investigator. This splendid reform must be carried through.

In doing this, we shall find no agency more helpful than manual training, now, happily, so coming into vogue. The industrial significance of this new form of schooling would alone render it valuable; but its strictly educational helpfulness will probably be found to constitute its chief worth. There are, in particular, five invaluable acquisitions which the average mind is more likely to receive from this source than from any other. One is accuracy, the importance of which I have already emphasized. A second is the priceless habit of observation. A third consists in the development of judgment, as in modelling and smithing, where the unaided eye, or rather the mind behind the eye, must fulfil the office that straight-edge, square, or bevel discharges in wood-work. A fourth rare advantage is cultivation of imagination, through pattern-making or foundry work, for instance, in which the essential processes cannot be followed by the outer eye, but must be regulated and controlled by the mind's constructive power alone. A fifth benefit lies in the prevention, or, if it has unfortunately been acquired, the cure, of pedantry, the pest and bane of so many bright minds.

It is hardly less essential to begin the study of foreign languages at ten or twelve than to begin learning observational science then. With good teaching, boys and girls will acquire

a foreign tongue more rapidly at that age than ever after. There seems to be no good reason why, if rightly instructed, the average boy of seventeen should not have as much Greek and Latin as now, and at the same time read and speak Italian, French, and German, instead of then or later having to begin these three. Italian is mentioned with French and German, because it is believed to be as easy to learn the three, in the order named, as to learn French and German alone.

In respect to Greek and Latin, it is an abomination that the study of these is usually made much longer than need be, so dry, philological, and abstract. To begin a classical tongue, more or less of hard and cheerless toil must of course be gone through. To the mastery of the needful accidence no royal road exists. The path is somewhat smoothed and shortened by the "natural method" so called, but it is rough and lengthy at best. The trouble is that a majority of our teachers persist in needlessly prolonging as well as intensifying this necessary agony.

In most colleges, classical culture, in the proper sense of the term, is hardly so much as aimed at. The great sweep of antique life, the fathomless depth of classical thought, the political development of Greece and Rome, their philosophy, their law, their literatures as wholes, their relation to modern times, are scarcely touched upon. Most of the *odium classicum* (if that is not very bad Latin) of recent years is due to classical teachers themselves. They have not tried to sound the depths of the riches lying at their feet. Students have asked for bread and have received stones.

Till recently, preparatory classical teachers could lay all the blame for this apathy upon the colleges. They could say, and did say, We are obliged to get our pupils ready for examination. The examinations are so and so. We have no resort but to teach accordingly. Now, however, the certificate system of entrance to colleges permits them to modify their methods, to enrich their teaching, to have regard for culture. It is time to cast aside Taylorism, and to see if we cannot inculcate some knowledge worth the having, even should our pupils

never reach college. Grammatical microscopy is useful up to a certain limit, but it is not edifying even when properly restricted.

Mere grammatical drill, with such work as is common in translating the texts of authors, has its use, but this use is commonly over-estimated. It can never, by itself, constitute a very advantageous or liberal education. But drill in art, literature, and history is liberal, and it is useful in any amounts. If it be said that the old fashion in this matter gives much information on history and literature, the reply is that, being communicated piece-meal, as cannot but be the case by this method, the information must be of next to no value. It is, of course, wholly unsystematic and hence soon forgotten. Suppose that all we had been destined ever to know about English history, life, and literature at large had consisted of tidbits thrown in while reading MILTON'S *Paradise Lost*, MACAULAY'S Essays, and BROWNING'S *Saul*.

In college, pupils who wish should certainly be permitted to travel the philological road and travel it to any length. But the entire class ought not to be forced to take that road. If the writer could have his way, he would divide every college class upon entrance, or at the latest by the middle of the first year, into two sections, those who gave and those who did not give promise of facility in the classic tongues. With the latter, reading in the original should form but a very small part of the work, and with the very poorest none at all. He would give them a classical course in English; books upon classical history, literature, art, and law, and translations from the noblest classical historians and poets, such as they could appreciate. One would expect those men to get through with the classics at the end of their freshman year, yet not a few would then have a clearer grasp of classical life, history, and ways, than our very best students can now boast on graduation.

The abler part of the class ought again to be divided into philologists and general culture scholars. The philologists should read enormously, at the same time canvassing certain pieces accurately under the most careful drill. The others should read at will illustrative extracts, but never be asked to

parse a word, carrying on, as far as possible in the original, the same sort of a course as the poorest men, only expatiating far more widely and going into all questions a great deal more deeply. Provision ought to be made so that any who wished might spend their whole four years mainly on the classics, and you may be sure that very many would do so.

We have thus, in a very cursory way, reviewed a certain new conception of education, the need of closer touch between teachers and pupils, some fresh means to thoroughness in our educational work, and the prospective introduction into that work of a few benign appliances of an economic kind.

Let us not fear progress. Nowhere more appropriate than in respect to educational work are LOWELL's lines:

> "New occasions teach new duties,
> Time makes ancient good uncouth."

E. BENJ. ANDREWS.

BROWN UNIVERSITY, Providence, R. I.

SECONDARY EDUCATION IN CENSUS YEARS.

A SCHOOL is even more an exponent of social conditions than a builder of other institutions, as may be illustrated in the history of secondary education in the United States in the fifty years since education was first a census inquiry.

Tables I, II, are condensed from the Census of 1840, or based upon it.

TABLE I.

SCHOOL STATISTICS OF THE UNITED STATES.

Census of 1840.

DIVISIONS.	Aggregate of Students and Scholars.	Universities and Colleges.	Academies and Grammar Schools.	Primary and Common Schools.	Number of Scholars at Public Charge.	Population of 1840.
		Number of Students.	Number of Scholars.	Number of Scholars.		
The United States	2,025,656	16,233	164,159	1,845,264	468,364	[1] 17,069,453
North Atlantic Division . .	1,413,231	6,619	97,376	1,309,236	370,851	6,761,082
South Atlantic Division . .	141,884	3,105	34,748	104,031	23,404	3,925,299
North Central Division . .	366,327	3,003	11,724	351,600	62,263	3,351,542
South Central Division . .	104,214	3,506	20,311	80,397	11,846	3,025,430

TABLE II.

APPARENT RATIO OF SCHOOL ENROLLMENT TO POPULATION.

1840.

	In all Schools.	In Universities and Colleges.	In Academies and Grammar Schools.	In Elementary and Common Schools.
The United States . .	1 : 8	1 : 1045	1 : 104	1 : 9
North Atlantic . .	1 : 5	1 : 1021	1 : 69	1 : 5
South Atlantic . .	1 : 28	1 : 1264	1 : 113	1 : 38
North Central . . .	1 : 9	1 : 1116	1 : 286	1 : 10
South Central . . .	1 : 30	1 : 863	1 : 149	1 : 38

[1] Includes 6100 persons on public ships in the service of the United States.

The colored race, then essentially illiterate, constituted about two-fifths of the population in the South Atlantic and slightly over one-third in the South Central division. The South Atlantic division in 1840 had 1 in 67 of the white population in attendance in secondary schools; the South Central, 1 in 93. In the isolation of families, some elementary work was done by private tutors and governesses.

In the absence of official record, fragmentary accounts and the memory of those who knew northern schools of 1840 indicate a general equality of the sexes in annual enrollment of common schools, with a swelling list of big boys in winter. In secondary schools the same conditions partly prevailed, with a growing preponderance of boys and young men as the superior schools were reached. The average age in school was much higher than now. The youth worked at home, in house and field and shop in busy months, and went to school in slack months till full grown.

The idea of general education at public expense, previously dominant in Massachusetts, had a great impulse just after the Census of 1840, and by 1860 it possessed the land north of the line of the Ohio River, except Indiana, where the change came later. Tennessee and leading cities of the south long ago had public schools. J. G. Holland was superintendent of public schools in Vicksburg (Miss.) before he was editor of the Springfield (Mass.) *Republican.* Rate bills rounded out the funds for elementary public schools even in New England not long ago, and they still continue in portions of the Union. Especially in southern states public and private funds blend to maintain public schools, as shown in Bulletins of the Eleventh Census. A transition for fifty years has been changing the significance of terms.

For 1850 and 1860 it is probable that what were called "Academies and Other Schools" included more elementary work than the "Academies and Grammar Schools" of 1840 when "Grammar Schools" corresponded to later high schools. In 1870 the combined private academies, day and boarding schools included elementary work, and public high schools

were credited with 73,047 aside from the high school pupils of California, Illinois, New Jersey, and Wisconsin who were not separated from the general enrollment. The estimate of 100,000 in public high schools in 1870 is amply justified, but no one can tell what to deduct for elementary work in private schools of that year.

In 1880 there was a failure to publish full returns.

Table III, outlining available returns for fifty years, covering secondary work, emphasizes two points: (1) Continuous changes in conditions and in the use of terms preclude close comparisons for different decades; (2) The facts recorded for schools are still so diverse and the care of records is so variable that no grouping of essential items into an accurate national summary for a current year is yet possible.

TABLE III.

Year.	Population.	Approximate Secondary Enrollment.	
1840	17,069,453	"Academies and Grammar Schools"	164,159
1850	23,191,876	"Academies and Other Schools"	261,362
1860	31,443,321	"Academies and Other Schools"	465,023
1870	39,818,449	Academies, Day and Boarding Schools . . . . . (Public High Schools, 100,000.)	597,556
1880	50,155,783	Not published.	
1890	62,622,250	Private . . . . . [1] 290,000 Public . . . . . [1] 300,000	[1] 590,000

The tendency is towards a clearer discrimination, though the public high school, simply the most advanced department of its locality, sometimes hardly lifts its highest class above elementary work. The high schools of some cities have a year or more of superior work, but short commercial courses are in vogue, in certain instances without foreign languages or mathematics above arithmetic.

University examinations give a standard for high schools in many states, and there is increasing facility in determining who had a test study like algebra. We may add the students in two mathematical studies as different persons, with a liabil-

[1] Subject to revision.

ity to error for those who took two of the studies within the year.

Table IV illustrates the variable form of the best material available for comparison of public secondary instruction. Ohio and Minnesota, with well-defined organization, appear to make high school and secondary school properly interchangeable terms. Maine, with like distinctness of organization, appears to include more elementary work in the high school, though securing something of the old-time maturity of pupils, still exalting the value of the winter's school in busy rural communities (average annual duration of high school, twenty-five weeks). Maryland, with a less number of nominal high schools, and Texas, with its varied district and community counties, independent districts, and few high schools, have many pupils in secondary studies.

High schools reach increasing numbers, not all having the zeal of rougher opportunities. Before St. Louis or Chicago had high schools, isolated pupils on Dardenne, in the Missouri woods, were fitting for college, and algebra was studied in country districts of the Rock River valley, where bearded pupils no longer maintain debating societies, and where city enticements for youth longing after learning or wages leave scant material for elementary schools.

TABLE IV.

Maine: Population, 661,086; in High Schools, 15,299, including 5936 in Mathematics above Arithmetic, and 1029 common school teachers.

Ohio: Population	3,672,316
High Schools.	
Boys	16,051
Girls	20,441
Total	36,491
Studying Algebra	25,839
Studying Geometry	6,919
Studying Trigonometry	1,324
Studying Algebra or higher Mathematics	34,082

Minnesota: Population		1,301,826
In High Schools, two chief cities		2,274
In State High Schools		3,665
Total		5,939
In State High Schools:		
Studying Algebra		2,111
Studying Geometry		964
Studying Algebra or higher Mathematics		3,075
Texas: Population		2,235,523
In High Schools:	*White.*	*Colored.*
Boys	1,113	
Girls	1,510	
Outside of High Schools:		
Studying Algebra	19,459	2,609
Studying Geometry	7,203	263
Totals of apparent secondary	29,285	2,872
Aggregate for both races		32,157
Maryland: Population		1,042,390
In High Schools and College, Baltimore		1,098
Outside of Baltimore:		
Studying Algebra		4,862
Studying Geometry		1,936
Total apparent secondary		7,896

Public secondary schools whose records are available, almost without exception have more girls than boys, which is greatly emphasized in graduating classes, often of girls only. Ohio reports in city high schools, 1890, 3785 boys, 10,210 girls; graduates, 1890, 305 boys, 784 girls; graduates of high schools of the state since their organization, 8415 boys, 18,903 girls, 55 sex not reported.

Every one is interested in the small child. Steps beyond the simplest elements retain the personal sympathy of a rapidly diminishing part of the people. The primary school directly interests all the community; not one-half of the people have a serious personal interest in the secondary school, not one-tenth have a like interest in superior education. Not only is there a

rapidly diminishing popular sympathy as the studies advance; we scarcely pass the non-partisan "I see a cat" and the cold formalism of the multiplication table, when those directly interested in the pupils divide on questions of fact and opinion to be taught. The most vehement denunciations are uttered against the publication of different editions, even of United States history, by the same publisher for sectional markets. Unity is not found among those who have seriously thought on physical, moral, or mental science or political economy. Conscientious lessons on the amount of silver that ought to be coined in a dollar would stir up as much excitement to-day in the public schools as any religious teaching.

Some comments one hears about the public high school have a general application; others are of local importance.

General. — 1. Teaching has been magnified above learning, tending to overwork for teachers and mental inactivity in pupils.

2. The managers are annually tempted to exalt immediate showy results as the condition of their permanency.

3. The desire for knowledge is fagged out in long-spun gradations below the high school.

4. Home life for boys over sixteen is almost wholly changed in the national flow to cities; it has even largely disappeared, while the cash counter, the office desk, and the typewriter, with their pitiful materialistic promises, disturb the domestic tastes of girls and their aspirations for noble lives.

5. The tendency is to remedy every defect in society, home influence, or knowledge by putting a new subject in the public schools, overloading teachers and pupils, and producing mental lassitude.

A famous inventor said, "I kept seeing points where my first machine could be improved, and went on adding devices till a farmer needed to be an engineer to run the reaper; then I just stripped it down to the simplest machine I ever made and it was the best success of my life," which is suggestive for patents to abolish vice and produce virtue without home responsibility.

Local. — 1. Boards have diluted courses of study to suit

those nightly occupied with social pleasures, discouraging and delaying earnest students.

2. Obligatory studies and compulsory authority of adopted text-books limit inquiry.

3. The courses of study are not adapted to actual conditions, the grades being exalted above the pupils.

Many a Board has copied a course of study from a distant city, as fit in the conditions as an overcoat, necessary in a northern winter, would be for the streets of New Orleans. Other Boards, aiming to set up juvenile colleges, have even used the terms Freshman, Sophomore, Junior, and Senior for boys and girls averaging sixteen years of age, "graduating" them with the accompaniments of brass bands, class dresses, class pictures, anniversary presents, parchment diplomas, class honors, bouquets, and addresses by the Honorable Messrs. Blank, to round out the "Commencement" exercises of the classes that have "finished" mental philosophy, political economy, the languages, and the sciences, "and are about to enter on the active duties of life," making the free high school costly to the pupil and belittling the conception of real college work.

The private secondary schools apparently approach an equality of the sexes in enrollment. Among reasons given why the public high schools have such inequality of sexes are:

a. More occupations are open to boys than to their sisters.

b. Parents see a waste of time for boys looking to collegiate or professional studies, and turn to other preparatory schools.

c. Girls are retained by a prospect for teaching; most city schools for training teachers take no others.

d. Women unduly predominate as teachers; a great boy wants some teacher who anticipates the experience of boys by his own knowledge.

e. Boys are more dependent than girls upon themselves for pocket money, and cannot meet the growing social demands of the high school without more than they are willing to ask from their parents.

f. Boys approach high school graduation when they have neither the perceptions of childhood nor manly experience.

The sense that one is really no longer a child is fraught with most physical danger to a girl, with most moral danger to a boy. In the new and sudden revelation of his power and knowledge he is apt to be over-confident in his ability to compete with men, while feeling awkward and embarrassed by the break in his life; when, for example, he finds he can no longer sing alto and has not the power or the practice to maintain tenor or bass, and rapid growth makes the neat suit of May a misfit in June. When his irreverent perceptions of sham and pretence are the most active of his life, distorting his estimates of present opportunity, when the most thoughtful home and school influence should focus upon him, we are apt to find him and his parents expecting small return for the special labors and expenses of the last year in the high school.

A great school system is much like an army — tremendous in efficiency and grand on review after rejecting all too weak, too young, too old or too short to wear a standard uniform and keep up a twenty-eight-inch step, starting at the appointed instant and carrying three days' identical rations and ammunition. Those not up to semi-military infantry standards increasingly claim thoughtful consideration.

JAMES H. BLODGETT.

WASHINGTON, D.C.

THE GREEK METHOD OF PERFORMING ARITHMETICAL OPERATIONS.

INSTEAD of the characters which we employ under the name of Arabic numerals, the Greeks used the letters of their own alphabet to designate numbers. The device which we employ of making the value of the digit depend on its position was unknown to them. Indeed, it seems not to have been generally known in Europe earlier than the thirteenth century. Accordingly, while we find ten symbols, including the zero, sufficient for notation, they found it necessary to employ twenty-seven. Of these twenty-seven symbols, they employed the first nine to designate units, the second nine to designate tens, and the third nine to designate hundreds. The following numbers, therefore, they designated by distinct symbols: 1, 2, 3, 4, 5, 6, 7, 8, 9, — units; 10, 20, 30, 40, 50, 60, 70, 80, 90, — tens; 100, 200, 300, 400, 500, 600, 700, 800, 900, — hundreds. As their alphabet contained but twenty-four letters, they supplemented it by inserting three additional characters, which they called *σταῦ*, *κόππα*, and *σαμπῖ*. *σταῦ* they inserted between *ε* and *ζ* as the representative of 6; *κόππα*, between *π* and *ρ*, as the representative of 90; and *σαμπῖ* they placed at the end, after *ω*, as the representative of 900.

α	β	γ	δ	ε	ϛ	ζ	η	θ
1	2	3	4	5	6	7	8	9
ι	κ	λ	μ	ν	ξ	ο	π	ϙ
10	20	30	40	50	60	70	80	90
ρ	σ	τ	υ	φ	χ	ψ	ω	ϡ
100	200	300	400	500	600	700	800	900

FIG. 1.

This table (Fig. 1) contains the letters of the Greek alphabet with the three supplementary letters inserted in their proper

places. Under each letter appears the Arabic numeral which expresses its value. Intermediate numbers, not provided for in the table, were written by placing the characters for the hundreds, tens, and units composing them in immediate succession, the character representing the hundreds being placed at the left, the character representing the tens in the middle, and the character representing the units at the right. Thus ϡλζ was the expression for 937. These symbols, without modification of any sort, sufficed for the expression of the numbers from 1 to 999 inclusive.

To express thousands from 1 to 9 inclusive, a mark resembling iota subscript, placed below and at the left of the first nine letters, was used. Thus ,γ designated 3000; ,ϛ designated 6000; ,θ designated 9000, etc. Accordingly 6937 was written ,ϛϡλζ. This device, together with the notation already explained, provided for the expression of numbers from 1 to 9999 inclusive.

For higher numbers a new device was added. The Greek word for 10,000 is *μυριάς*, from which our word *myriad* is derived, and its initial letter is *μ*. This letter, written large and placed under the symbol of a given number, multiplied that number by 10,000; and so, with the aid of the symbols already explained, provided for the expression of any number of myriads, or tens of thousands, from 1 up to 9999. Thus $\overset{M}{\alpha}$ designated one myriad, or 10,000; $\overset{M}{\beta}$ designated two myriads, or 20,000, etc. In the same way, $\overset{M}{,ϛϡλζ}$ designated 6937 myriads, or 69,370,000. We divide our numbers, in numerating, into periods of three figures each. The Greeks, by the use of this last device, obviously divided theirs into periods of four.

When a number made up of myriads and lower denominations was to be expressed, they placed a point between the group of characters designating the myriads and the group designating the lower denominations. Thus 69,378,432, which is the same as 6937 myriads and 8432, was written $\overset{M}{,ϛϡλζ}\cdot,ηυλβ$. In this way provision was made for the numbers from 1 to 99,999,999 inclusive.

This notation sufficed for the purposes of ordinary life. The next higher number, *i.e.* 100,000,000, they called *μυριὰς μυριάδων*, a myriad of myriads; and until the time of Archimedes and Apollonius of Perga, their system of notation by symbols went no farther.

The operations of addition and subtraction were performed by the aid of a tablet called *ἄβαξ*, or *abacus*. Of this tablet there were several forms, all involving, however, the same principle; namely, the use of a separate division, or column, for each order of units. The abacus, as used for addition and subtraction, therefore, may be defined as a tablet divided by parallel lines into sections which serve to distinguish the different orders of units. The tablet might have a plane surface covered with sand, in which case the parallel lines would be drawn in the sand by means of a pointed stick. This was the simplest form of the abacus, and was used by children receiving instruction in arithmetic. With such an abacus, pebbles, or counters of some kind, represented the different orders of units, the value denoted by a given pebble depending on the compartment in which it was placed. Again, the tablet might be made of metal, in which case the different orders of units might be represented by parallel rods strung with movable balls, or by parallel grooves with sliding buttons, or by parallel slits with sliding buttons or double-headed nails.

Figure 2 represents (with slight modifications borrowed from another antique for convenience in explanation) an ancient abacus now preserved in one of the museums in Rome. The divisions which serve to distinguish the different orders of units are in this case oblong slits, and the units themselves of the different orders are represented by buttons, which can be moved to and fro in the slits. There are, as will be seen, two sets of slits, an upper and a lower. When the buttons are at rest at the outer extremity of their respective slits, as represented in the figure, the abacus is not in use, but is ready for use. In this position, in other words, the buttons register no values; they merely represent potential values. The signs which appear at the inner extremities of the lower slits express

the denominations of the several orders of units. Disregarding, for the present, the two sets of slits at the right, and considering only the seven sets at the left, it will be seen that the slits, upper and lower, marked Ι are appropriated to units; the slits marked Χ, to tens; those marked Ϲ, to hundreds; those marked ⟨Ι⟩, *i.e.* with a Ϲ on each side of a vertical line, to thousands; those marked ⟨ΙΙ⟩, *i.e.* with two Ϲ's on each side of a vertical line, to tens of thousands; those marked ⟨ΙΙΙ⟩, *i.e.* with three Ϲ's on each side of a vertical line, to hundreds of thousands; and

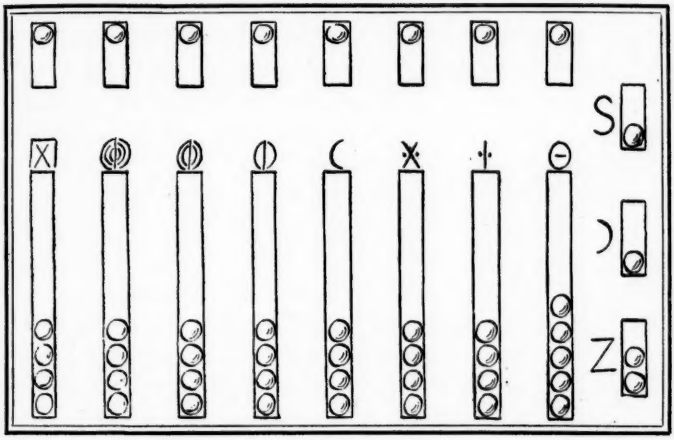

FIG. 2.

those marked ⟦Χ⟧, *i.e.* with an Χ enclosed by straight lines on three sides, to millions. This abacus can be used for working sums in addition where the result does not exceed 9,999,999. Each lower slit of the seven now under consideration contains four buttons, and each corresponding upper slit contains but a single button.

When the single button of an upper slit is pushed forward to the inner extremity of the slit (see the second, fifth, and sixth upper slits in Fig. 3), it represents five units of the order to which it belongs. When one of the buttons of a lower slit is pushed forward to the inner extremity of the slit (see the second lower slit in Fig. 3), it represents one unit of the order to which it belongs; and in like manner when two, three, or

four buttons are pushed forward (see the first, third, and seventh lower slits respectively in Fig. 3), they represent a corresponding number of units of the order to which they belong. When, therefore, the three buttons of a lower slit are pushed forward to the inner extremity of that slit, and the single button of the corresponding upper slit is pushed forward to the inner extremity of its slit (see the fifth lower and upper slits in Fig. 3), the abacus will register eight units of the order to which both slits belong. If three buttons of a lower slit are pushed forward

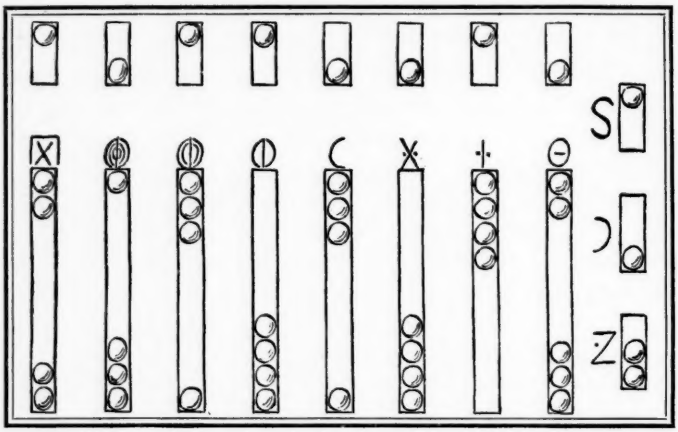

FIG. 3.

and the single button of the corresponding upper slit remains at rest (see the third lower and upper slits in Fig. 3), only three units of the order in question will be registered. Figure 3, therefore, represents the buttons of the first seven sets of slits so adjusted that they register 2,630,854.

Up to this point we have disregarded the eighth and ninth sets of slits. These are for the expression of fractions. The Romans employed the duodecimal system. Accordingly, the lower slit of the eighth set contains five buttons, each representing $\frac{1}{12}$, while the single button of the upper slit represents six units of the same order, or $\frac{6}{12}$. By means of the upper and lower slits, therefore, any number of twelfths from 1 to 11 may be represented. The fractional reading of the buttons of the

eighth set of slits, as arranged in Fig. 3, is $\frac{8}{12}$. The button in the slit marked S, the abbreviation for *semuncia*, represents, when pushed forward as in the figure, one-half of the preceding denomination; that is, $\frac{1}{2}$ of $\frac{1}{12}$, or $\frac{1}{24}$. The button in the slit marked), the abbreviation for *sicilicus*, if pushed forward, would represent $\frac{1}{4}$ of $\frac{1}{12}$, or $\frac{1}{48}$; and each of the buttons in the slit marked Z, the abbreviation for *duella*, or *duae sextulae*, if pushed forward, would represent $\frac{1}{6}$ of $\frac{1}{12}$, or $\frac{1}{72}$. Taking, now, the eighth and ninth sets of slits in connection with those previously considered, the reading of the abacus, as arranged in the figure, is $2{,}630{,}854\frac{17}{24}$.

With this detailed explanation of the construction of the abacus, it will be easy to trace the process by which examples in addition and subtraction were performed by means of it. In the case of addition, the buttons would first be set so as to register the first of the numbers to be added. Then, beginning with the units of the second number, and proceeding with the tens, hundreds, etc., of that number, the computer would rearrange the buttons, step by step, until they registered the sum of the two numbers. To this sum he would add the third number, rearranging the buttons as he proceeded, and so continue until the numbers to be added had been exhausted. The final reading of the abacus would be the sum sought.

In the case of subtraction, the buttons would be first set so as to register the minuend. Then, taking the units, tens, etc., of the subtrahend from the units, tens, etc., of the minuend, very much as our primary children do now, and rearranging the buttons as he proceeded, the computer would have, as a final result, a reading which would represent the remainder.

Figure 4 represents an Attic abacus found in the island of Salamis. It is a marble slab, one and a half metres in length by three-fourths of a metre in width. Near the side marked A are five parallel lines, forming four interspaces or bands; and beginning at the middle of the slab and extending towards the side marked C are eleven other parallel lines, forming ten bands. This second set of parallel lines is bisected by a transverse line. At the points at which this transverse line inter-

sects the third, sixth, and ninth parallel lines, appear crosses, the office of which seems to be to prevent the person using the instrument from becoming confused by the multiplicity of lines, and so to enable him to select a particular band quickly without mistake.

Along the sides B, C, and D appear certain characters, the meaning of which must be explained before we can understand the method of using the abacus in computations. A close

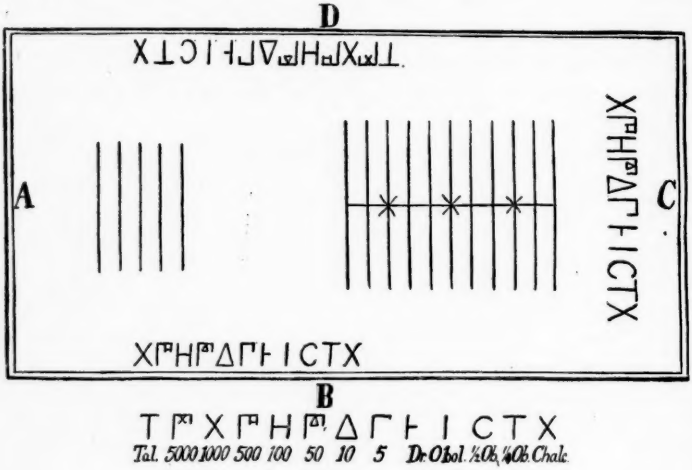

Fig. 4.

examination shows that the characters in each of the three series are the same, and that they occur in the same order, the only difference being that the series on the side D has two characters which those on the sides B and C lack. Beginning at the right of the series, which for convenience of reference is printed in duplicate at the bottom of the figure, and proceeding towards the left, we find in the fifth place the sign of the drachma (Ꮒ), which was the unit of the Attic system of weights, and therefore of money. This abacus was evidently used in money computations: perhaps it formed a part of the counter, or table, of a money-changer. The sign of the drachma representing unity, the remaining characters towards the left have

the values indicated in the table. Thus Γ represents 5, Δ 10, ΓΔ 50, H 100, ΓH 500, and X 1000. Of the two signs found on the side D, and not found on B and C, ΓX represents 5000, and T, the sign of the talent, which was equal to 6000 drachmæ, represents 6000. In using the abacus, the computer may sit on the side B or on the side D, for in both cases the bands to be used in adding and subtracting, and the series of characters marking the values which the bands represent, will present the same aspect. If he has to deal with large sums, however, he will sit by preference at the side D, which alone bears the characters representing the highest denominations.

Let us suppose that the abacus lies in a horizontal position, and that the computer is sitting at the side D. In making his additions, he will arrange his counters in the different bands, and rearrange them as he proceeds, the values of the counters changing according to the bands in which they are placed. The principle of procedure is the same here as in the case of the Roman abacus already explained. Each band represents a different order of units; those on the hither or computer's side of the transverse bisecting line representing respectively the orders which begin with 1, 10, 100, 1000, and 10,000, and those on the farther side of the transverse line representing respectively the orders beginning with 5, 50, 500, 5000, and 50,000. For money computations coming within the limit of one talent, the bands at the right of the central cross will suffice. From that point, in the case of larger computations, a new progression by talents will begin, for which the bands at the left of the central cross will be used. This new order of progression may proceed to the same length as the preceding. The scope of this abacus, therefore, is somewhat greater than that of the Roman abacus previously considered.

The five parallel lines near the side A, which form four inter spaces or bands, are for the computation of fractions, and the four characters at the right of the sign for the drachma correspond to these four bands. I represents the obolus, which was one-sixth of the drachma, and the band corresponding to it, therefore, is appropriated to sixths. ⊂ represents the half-

obolus, and the corresponding band is appropriated to twelfths. T represents the quarter-obolus, and the corresponding band is appropriated to twenty-fourths. X represents the chalcus, the lowest Attic monetary unit, equal in value to one-eighth of an obolus, and the corresponding band is appropriated to forty-eighths.

Rangabé, who, in 1846, announced, in the *Revue Archéologique*, the discovery of this slab, at first saw nothing in it but a kind of draught-board; Letronne soon showed that it was an arithmetical table, and determined the value of the characters; and Vincent, in turn, explained the method of using it.

In the admirable and exhaustive historical treatise on arithmetic contributed by Dr. George Peacock, late Dean of Ely, to the Encyclopedia Metropolitana, in 1845, occurs the following passage: "It is not very easy to give a complete account of Greek arithmetical operations; there is no work of antiquity extant in which they are specifically detailed, and it is only in the Commentaries of Eutocius on the 'Measure of the Circle' of Archimedes that we can find any considerable number of examples of multiplications exhibited at full length; and even in this case, the variations which are found in different manuscripts in the order and form in which the different steps and symbols in the process are written, prevents our speaking, in a positive manner at least, with respect to them."

The Eutocius here mentioned lived in the sixth century A.D. He wrote commentaries on parts of the works of Apollonius of Perga and Archimedes, both of whom lived in the third century B.C. In preparing his commentaries on the writings of Archimedes, however, he used the edition of that author's works which in his time was pronounced the best, so that his commentaries have frequently been helpful to editors in the correction of mistakes occurring in the manuscript copies of Archimedes that have come down to us. Whatever may be the defects of Eutocius's commentaries as an authentic record of the ancient Greek arithmetical operations, they furnish, at any rate, the earliest and most trustworthy material that we have. The following example, in which the details of the mul-

tiplication as given by Eutocius appear at the left, and a numerical translation of the symbols and operations at the right, is from his commentary on the third proposition of Archimedes on the measure of the circle.

To find the square of $\rho\nu\gamma$, or 153.

$\rho\,\nu\,\gamma$	153	*Multiplicand.*
$\rho\,\nu\,\gamma$	153	*Multiplier.*
	10,000	*First Partial Product.*
$\underset{M}{\alpha}\,{}_{,}\epsilon\,\tau$	5,000	
	300	
	5,000	*Second Partial Product.*
${}_{,}\epsilon\,{}_{,}\beta\,\phi\,\rho\,\nu$	2,500	
	150	
	300	*Third Partial Product.*
$\tau\,\rho\,\nu\,\theta$	150	
	9	
$\underset{M}{\beta}\,{}_{,}\gamma\quad\upsilon\quad\theta$	23,409	*Answer.*

FIG. 5.

A detailed explanation of the operations here represented will make the process clear. As ρ represents 100, ρ multiplied by ρ will give 10,000, which is expressed by $\underset{M}{\alpha}$; as ν represents 50, ν multiplied by ρ will give 5000, which is expressed by ${}_{,}\epsilon$; as γ represents 3, γ multiplied by ρ will give 300, which is expressed by τ. Accordingly, the first partial product is $\underset{M}{\alpha}\,{}_{,}\epsilon\tau$, or 15,300.

In the same way, ρ (100) of the multiplicand multiplied by ν (50) of the multiplier will give 5000, which is represented by ${}_{,}\epsilon$; ν (50) multiplied by ν (50) = 2500, which is represented by ${}_{,}\beta\phi$; γ (3) multiplied by ν (50) = 150, which is represented by $\rho\nu$. Accordingly, the second partial product (simplification being for the present postponed) is ${}_{,}\epsilon\,{}_{,}\beta\phi\rho\nu$, or 7650.

Again, ρ (100) of the multiplicand multiplied by γ (3) of the multiplier will give 300, which is represented by τ; ν (50) multiplied by γ (3) will give 150, which is represented by $\rho\nu$; γ (3) multiplied by γ (3) will give 9, which is represented by θ. Accordingly, the third partial product is $\tau\rho\nu\theta$, or 459.

We will now combine the partial products, simplifying where simplification is possible. $_{,}\epsilon$ (5000), $_{,}\epsilon$ (5000), and $_{,}\beta$ (2000), when combined, give 12,000, or one myriad and 2000. This myriad added to the myriad expressed by $\overset{M}{a}$ will give two myriads, which is expressed by $\overset{M}{\beta}$. Again, τ (300), ϕ (500), τ (300), ρ (100), ρ (100), ν (50), and ν (50), combined, give 1400, or 1000 and 400. This 1000 added to the 2000 which remained from the previous combination makes 3000, which is expressed by $_{,}\gamma$. The 400 left from the last combination is expressed by υ, and the θ (9) is brought down. The answer is, therefore, $\overset{M}{\beta}{}_{,}\gamma\upsilon\theta$, or 23,409.

Eutocius gives no example of division; and in repeated instances where the square root of a number is required, he assumes the root, obtains its square, and then shows that the square as calculated coincides, or approximately coincides, with the number whose square root was required.

If the multiplication of the foregoing numbers appears to the reader a simple operation, it appears so probably because I have used the modern notation as an auxiliary in explaining it. To the Greeks it was more difficult, as a moment's reflection will show. We know at a glance the product of 50 and 50 from the nature of our notation, because we know the product of 5 and 5. To 25, the product of 5 and 5, we merely have to annex two zeros. But $_{,}\beta\phi$, the product of 50 and 50 as expressed in the Greek notation, has nothing in common with $\kappa\epsilon$, the product of 5 and 5, and therefore could not be suggested by it. When we reflect how greatly we are aided in arithmetical operations by a system of notation in which multiplication by 10 or its multiples is effected by merely changing the place of the number to be multiplied, we see at once that to the Greeks, who knew nothing of this device, multiplication was a relatively complex and difficult process.

I can only mention, in passing, Archimedes' scheme of octads, elaborated in his work entitled $\psi\alpha\mu\mu\acute{\iota}\tau\eta\varsigma$, by means of which he extended the meagre system of notation described at the beginning of this paper so that it became capable of ex-

pressing any conceivable number. The progress of science, more particularly of astronomical science, in his time, had rendered such an extension indispensable. I must also pass over the general features of the scheme of tetrads, with which Apollonius of Perga replaced the octads of Archimedes. One feature of that scheme, however, is worthy of special attention here, because it effected an important simplification in the process of multiplication.

Apollonius lived, as I have said, in the third century B.C. That part of his work which was devoted to arithmetic is lost, but the substance of it formed the second book of the mathematical collections of Pappus, one of the later Alexandrian geometers. Unfortunately, the first fifteen of the twenty-seven propositions contained in that book are lost; but enough remains to give a sufficiently clear notion of Apollonius's method. I have already shown that the process of multiplication as performed by the Greeks was rendered difficult by the absence of all recognition in their notation of the relation which subsists between the nine digits and the articulate numbers which result from multiplying them by the different powers of 10. Thus, 5, 50, and 500, whose relationship our notation reveals at once to the eye, were represented among the Greeks by ϵ, ν, and ϕ respectively, symbols which are wholly independent of one another. The object of Apollonius's researches was to facilitate multiplication by remedying this defect.

The first nine numbers, represented by α, β, γ, δ, ϵ, ς, ζ, η, θ, he called bases. The articulate numbers which result from the multiplication of these bases by 10, 100, and 1000, he called analogous numbers, or, briefly, analogues. Thus, ϵ (5) is a base, and ν (50) and ϕ (500) are its analogues; η (8) is a base, and π (80) and ω (800) are its analogues. In performing multiplications, he replaced analogues by their bases, found the product of the bases, and then, by the application of certain propositions, the effect of which was analogous to the modern device of appending the necessary number of 0's, reached the required result. The rule of procedure may be stated thus:

Write in succession in a horizontal line the analogues to be

multiplied. Form a second horizontal line by writing immediately below each analogue the ten, hundred, or thousand by which its base must be multiplied to produce the given analogue. Form a third horizontal line by writing below each analogue its base. We are now ready to form the partial products. First, obtain the product of the bases in the third line, and write it at the right of that line. Then obtain the product of the tens, hundreds, or thousands in the second line, and place it at the right of that line. Finally, multiply these two partial products, and place the result at the right of the first line. This final result will be the product required.

In obtaining the product of the tens, hundreds, etc., of the second line, advantage is taken of the fact that for every four tens, or two hundreds, appearing as factors in that line, a myriad will appear as a factor in the corresponding partial product. In performing this part of the multiplication, therefore, 1 is allowed for each ten appearing as a factor, 2 for each hundred, and 3 for each thousand, and the sum of these 1's, 2's, and 3's is divided by 4. The quotient will be the number of myriads which are to appear as factors in the partial product. An example taken from Pappus's collection will make this clearer.

$\nu\nu\nu\mu\mu\lambda = \xi\mathrm{M}\upsilon.\mathrm{M}\upsilon = 6{,}000{,}000{,}000.$

$\iota\iota\iota\iota\iota\iota = \rho\mathrm{M}\upsilon = 1{,}000{,}000.$

$\epsilon\epsilon\epsilon\delta\delta\gamma = {}_{,}\varsigma = 6{,}000.$

FIG. 6.

Let it be required to find the product of the analogues ν (50), ν (50), ν (50), μ (40), μ (40), and λ (30). Writing in a horizontal line the factors to be multiplied, we have: $\nu\nu\nu\mu\mu\lambda$. Writing below each analogue the ten by which its base must be multiplied to produce the given analogue, we have: $\iota\iota\iota\iota\iota$. Writing in a third horizontal line under each analogue its base, we have: $\epsilon\epsilon\epsilon\delta\delta\gamma$. We are now ready to form the partial products. Obtaining the product of the bases, we have ${}_{,}\varsigma$, or 6000, the first partial product. Next obtaining the product of the tens in the second line by finding their sum, 6, and dividing that sum by

4, as already explained, we have one myriad as a factor of the second partial product, with two tens remaining. As these two tens are factors, their product will be 100, or ρ. The second partial product, then, is $\overset{\text{M}}{\rho}$, or, as Apollonius preferred to write it, $\rho\text{M}\upsilon$. The last step consists of the multiplication of the two partial products to form the complete product. Provision was made for this final multiplication in certain of the lost propositions, but the method is easy to trace. Allowing 2 for ρ, which represents the factor 100, and 3 for the thousand-mark prefixed to ς, and dividing the sum of 2 and 3 (5) by 4, we have 1 for the quotient, which shows that the final product will contain another myriad as a factor, in addition to that already found in the second partial product. The factor 10, which remained after the division, will raise the base ς to its analogue ξ (60), and the final product is $\xi\text{M}\upsilon.\text{M}\upsilon$, *i.e.* 60 myriads of myriads, or, in the language of Apollonius, 60 double myriads. In modern language this is 6 billions.

A second example, required the product of σ (200), τ (300), υ (400), and ϕ (500), is here added to show the application of Apollonius's method to the multiplication of analogues involving hundreds.

$$\sigma\tau\upsilon\phi = \rho\kappa\text{M}\upsilon.\text{M}\upsilon = 12{,}000{,}000{,}000.$$
$$\rho\rho\rho\rho = \alpha\text{M}\upsilon.\text{M}\upsilon = 100{,}000{,}000.$$
$$\beta\gamma\delta\epsilon = \rho\kappa = 120.$$

FIG. 7.

Allowing 2 for each ρ in the second line, and dividing 8, the sum of these 2's, by 4, we find that two myriads will enter as factors into the second partial product. The remaining parts of this example differ in no respect from the preceding.

JOHN TETLOW.

GIRLS' HIGH AND LATIN SCHOOLS, BOSTON.

WHEN SHOULD THE STUDY OF PHILOSOPHY BEGIN?

ALTHOUGH, ordinarily, philosophical studies are not begun until the student, in college or university, has reached almost the end of his career as a student, there seems ample reason for the assertion — which, together with some of its corollaries, we shall here attempt to maintain — that such studies may and, properly, should begin earlier, begin, in fact, when the notion of self and the faculty of independent self-determination, whether as thought or as impulse, begin positively to assert themselves. Indeed, it may be said that they always do really begin then, indirectly if not openly, in some form; but as this form, if not consciously determined by a competent hand, may be a bad one, the necessity exists of making sure that philosophy in a *sound* form be begun when the faculty for it awakens, — even a "*little*" of *false* philosophy *is* a "dangerous thing" and should be forestalled in youth if possible.

The prevalence, in colleges and universities, of the custom of having the philosophical courses occur at the latter end of the curriculum is probably owing to the erroneous idea that philosophy is concerned with what is transcendent, and only with what is transcendent, in its nature, and is comprehensible only through abstruse and recondite conceptions, and that, therefore, it is wholly beyond the capacities of young minds; coupled with the idea, which smacks strongly of empiricism, that a "*little* philosophy [of whatever sort] is a dangerous thing," — as if philosophy were chiefly a matter of quantity. But the truth is, rather, that philosophy, as the universal science — "universal" not merely as having to do with "universal truth," but as being an activity of the spirit which all minds that have awakened to self-determination can engage in, though of course in different degrees — is concerned with what is immanent as well as tran-

scendent, and is within the possible range even of the incipient intellect, or incipient power of thought as such.

At least three important reasons may be given for the commencing of philosophical studies in some sound form when the faculty of self-determination begins to assert itself. First, this faculty as mere faculty is at the beginning merely formal, is subject to error until it has had time to develop itself: it requires limitation and guidance — *discipline*, in short, which can be afforded it only by (sound) philosophy, or the science of self-determination, in some form. Second, philosophy in some form is needed as a means of organizing growing knowledge, or establishing in the student's mind relations between distinct branches of knowledge; and in fact almost spontaneously suggests itself to the student even in the early stages of his really intellectual work. Third, philosophy is required as a means of developing and perfecting the pure notion of self and power of pure self-determination. Let us now consider (briefly) the matter of each of these reasons separately.

The period, in the life of the individual, of the awakening of the faculty of self-determination is unquestionably a most critical one. This faculty, before it has been subjected to training, sets the individual in whom it has awakened, at war with all the world besides himself and even with himself: it does so, because, instead of allowing the individual to take things just as they appear or are "given," it causes him to distinguish them, to isolate single things and consider them by and in themselves merely. Under its sway he disjoins what time and space, association and habit, — nature, in short, — have joined together. He assumes that things as they really are are "things in themselves," or things out of relation. He becomes mentally buried in a single fact or idea, absorbed in himself, distrustful of what is without; is prone to take a part for the whole, an accident for the substance of things, to assume that merely formal liberty of choice or decision is true freedom of mind. This faculty, undisciplined, is precisely the cause and essence of the pugnacious negativism, the dogmatic self-assertion, whether in the form of over self-confidence or morbid distrust of self and

all things else, well known to be characteristic of youth. It, more than anything else, gives rise to the necessity for the employment of discipline in the bringing up to sober manhood of the young. What is called passion, of which, conspicuously, youth is a subject, is but this incipient thought, the tendency and habit of isolating and over-emphasizing particular things or ideas. And this faculty, even when it has passed from its first stage of mere conception and mere impulse, to its second, of judgment and conscious desire, is erratic and arbitrary, — not yet a real faculty. It joins together things which are not fitly joinable; makes propositions whose predicates have no affinity, or are not commensurate, with their subjects; is frequently guilty of contradicting the nature of things, and even itself also. It makes the individual in whom it dwells disposed to assume that truth is an attribute of his every thought or deed, whereas that thought or deed is almost certainly erroneous because it is a consequence of a too positive (or, if one prefer, too negative), a dogmatic, attitude of mind. Under its sway, the individual is in constant danger of thinking of himself as a sort of world-reformer, — as the substance of which other individuals and external things are merely accidents, as the subject of which they are predicates. Again, the inferences and volitional determinations of this incipient faculty of self-determination are almost necessarily wrong, materially and formally: materially, because its conceptions and impulses are one-sided, its judgments and desires contradictory and perverse; formally, because owing to its one-sided dogmatic tendency, it fails to make an impartial survey of the terms to be united by inference or choice, and thus mistakes a partial for a complete identity of terms in premises and conclusion of logical or moral syllogism. The total attitude of such a faculty undisciplined as a mere faculty, — its method and its view of the external world and of self, — is inevitably crude, distorted, repulsive. In the individual in whom the faculty as described has sway there is, obviously and certainly, a state of being which requires to be mended. Such an individual, the would-be reformer, himself needs reforming. The required reformation can be really brought about only by means of philosophical studies on the part of the individual.

The function of philosophy as the means by which the mind's knowledge as such is organized into a coherent whole would consist in the pointing out of the first principles of each branch of knowledge, and the showing of the dependence of those of one branch upon those of others, and the determination of the values of knowledge by reference to the end of knowledge, — philosophy as system in general is the system of all other branches of knowledge. Unquestionably, even a little sound philosophy would be of immense value to the student in university, college, and even high school, in the making of the annual or semi-annual or life choice of his studies with due regard to the end and order of studies: indeed, now that the choice of studies is coming, or even has come, to devolve wholly upon the student himself, a little philosophy is not only not dangerous, but really indispensably necessary. And how much embarrassment to the student, how much waste of precious time and energy upon uncongenial and unprofitable studies, might not be prevented by the possession of a mere outline of the philosophical anatomy of human knowledge! Francis Bacon, preparatorily to entering positively upon the work of his great scheme for the advancement of human knowledge and practical welfare, made what he called a map of the existing intellectual globe, a philosophical survey of existing human wisdom. Some such map, more or less complete in detail, every student needs as a guide to his navigation of that portion of the sea of knowledge upon which he sets out. Philosophy as the system of knowledge in general is the map of the intellectual globe in its fundamental features.

The formal disciplining of the faculty of self-determination, and the nourishing it with the various forms of organized truth, prepare the way for that *pure* self-determination — self-determination independently of all particular knowledge and impulse as merely particular — which is the hidden essence of the mind from the beginning, and present in greater or less degree in all mental activity, and which constitutes what is called character. Now, philosophy is precisely the form of truth which answers to this pure self-determination, — to character; and the study

of philosophy during the period when character is beginning to develop, cannot but be a most rational thing. Philosophy acts upon character by revealing it to itself, — the notion of pure self-determination working, when revealed, its own realization. This, its highest function, philosophy does not, indeed, perform so completely in the beginning as later; but no person who has arrived at the age of reflection is incapable of grasping the notion of the pure self and realizing in himself to a certain extent the pure act of will.

From what has been said it may properly be inferred that philosophical studies in some form may be taken up when those other, non-philosophical, studies which are intended as discipline or for substantial nourishment (or both) of the intellectual nature as such are taken up — the natural sciences, geometry, grammar, history, literature, etc. It is precisely the knowledge contained in such branches that philosophy has to co-ordinate; it is precisely the method of scientific reflection that philosophy has to explain and show the bearings and limitations of. And the fact that it is comparatively easy to teach philosophy (to a certain extent) in connection with these branches of knowledge is a proof that the time for beginning philosophy is coincident with that of beginning seriously or scientifically the more important other branches of knowledge. It is quite possible — and it is important — that the student of the natural sciences should, not far from the beginning of his work in them, learn something of the method governing them, — of generalization, the right framing of conceptions, induction, deduction, etc. The beginning student of geometry is able to apprehend the fact, together with its bearings, that geometry is a real science only because space is an *a priori* form of sensible perception, or the fact that axioms, postulates, definitions, which are ultimate for geometry as such, are not so for the general theory of knowledge. The ordinary student of scientific grammar ought not to find the philosophical doctrine of categories entirely beyond his power of comprehension, and ought to be able to appreciate in a true general way its bearing upon grammar as a science, and the dependence of grammar on a higher form of knowledge. The

beginning student of history might without great difficulty grasp and employ with true effect the philosophical notion of increasing human self-determination as the goal and law of history. The student of literature is prepared to apprehend the meaning of literary art as an expression of essential ideal truth in imaginative forms.

If the foregoing is correct, it follows that philosophical studies, instead of being relegated to the last years of the college or university course, should be taken up, to a certain extent, even in the high school, and certainly in a business-like manner in the early years of the college-university course. Only when this is done, let it be added, is the student in philosophy prepared to take up at the end of his college or university course those higher philosophical studies which may fitly be regarded as the crown of all scholastic life; or (to express ourselves from another point of view) to become a worthy pupil of any choice spirit who, by long years of intellectual and personal preparation, may have duly qualified himself to give instruction in such studies.

We are not oblivious to the fact that there are certain "practical" obstacles to carrying philosophical studies further forward in the general curriculum of studies in high school and college or university. These we have not space here to discuss. We are very strongly inclined to think that they would mostly disappear were only a true conception of the nature and importance of the function of philosophy as a study prevalent. There seems abundant reason to believe that when philosophy is practically recognized according to its true value, it will have made for itself, without much extraneous assistance, a noticeable place in the early years of the college or university course, or even in the later years of that of the high school.

B. C. Burt.

Ann Arbor, Mich.

EDITORIAL.

WITH a diffidence natural to its extreme youth, SCHOOL AND COLLEGE bids its readers a Happy New Year. Does the educational arena seem already thronged with worthy contestants for public favor? Possibly. Yet this newcomer sees a niche where it may gain a foothold, and from this it hopes to climb, by well deserving, to a high place in the esteem of all who love the cause it aims to serve. What is this cause? The improvement and co-ordination of secondary and higher education in America. That this field is a somewhat narrow one, is readily confessed. It is believed that the magazine will be all the more useful to the general cause of education for that very reason. Specialization is the rule of the hour. Let us focalize the keenest minds devoted to education for a few years on the urgent problems within the limits of our chosen range, and then, if all are satisfactorily solved, SCHOOL AND COLLEGE promises either to broaden the scope of its beneficent operations, or else to retire from the field altogether.

The editorial pen which indites the present words is, of course, brand new. It has not acquired the virtues so richly possessed by its elder brethren by reason of their longer service. It cannot yet settle off-hand any question that may arise, neither has it the skill to slash right and left among opponents, though it well knows that in this the pen is often mightier than the sword, — because it can be wielded from a safer distance. With something of the simplicity of childhood, doubtless, it hopes ever to be considerate, helpful, and truthful, and to add to its influence as it shall merit respect.

One word more may well be said. The magazine asks for an adequate support. Its origin is in a profound faith that the service it offers is needed, — needed through no fault of others, but because of the natural expansion of certain departments of the educational field. If our faith is well grounded, friends will flock to the support of the enterprise with purse and pen,

and in due time will supply means of enlargement and of added power. The other alternative we will not now consider. Of one fact, however, our readers may feel assured, SCHOOL AND COLLEGE will not be the special organ of any publisher. "*Tros Tyriusque mihi nullo discrimine agetur.*" The editorial management will be wholly untrammelled, and will proceed on as broad and liberal plans as the needs of the enterprise seem to require.

Professor Hall of Harvard College recently mentioned, at an educational meeting, that the last entrance examination in experimental physics which he conducted cost the college five hundred dollars. When we consider that the men thus examined were but two-thirds of those who presented that one subject at Harvard, that numerous other subjects were offered, both at Cambridge and in several other cities, at the cost of the same college, and that all the other colleges were at large expense for a similar reason, the thought arises, Cannot this whole matter of examination be managed more economically? Of course, some of the colleges have begun to accept certificates from accredited schools in lieu of an examination for entrance. But there is strong objection to this practice on the part of both professors and preparatory teachers, and this in spite of the favorable testimony of the institutions that have experience with the certificates. At least one of these colleges has examinations immediately after entrance, in order to grade the Freshmen in their college work. In general, the expense of an entrance examination in money, time, and energy is accepted as a necessary evil.

Would not this evil be lessened by co-operation in the conduct of examinations? As long ago as 1885, Dr. Robert P. Keep proposed that the New England colleges establish a joint commission to conduct examinations and grant certificates that should be valid at the door of any college in New England. We fail to see why the plan cannot be made practicable. It certainly would lessen expense. By a plan of graded certificates, the smaller colleges could have their special needs met. The nucleus of such a body already exists in the Commission of

Colleges in New England on Admission Examinations. There is a call just now for an expansion of the powers of that commission, so that it may consider not only uniformity of requirements, but generally the subjects of admission requirements and modes of examination. It might easily be given executive powers, as well as advisory relations, and might be authorized to conduct examinations for all the colleges that are represented in it. Furthermore, it might be given authority to examine and designate schools from which master's certificates should be honored by the colleges.

It is not difficult to predict the ultimate issue of the conflict about which our English correspondent writes so interestingly. As a compulsory study, Greek must go, in England as in America and on the Continent. This result will bring in its train losses as well as gains, but the spirit of the times will prevail. True, a vote of 525 to 185 against the proposal for inquiry seems tolerably decisive, so far as the senate at Cambridge may be regarded as a representative educational body; yet all accounts agree that this action will but intensify the agitation, and render the reformers more persistent than ever. The older theory, that there is but one avenue to a liberal education, will gradually succumb to its modern rival, that this end may be reached through various paths. It would not be surprising, however, if the pendulum, even in conservative England, should swing too far over. The great English universities have long aimed "at raising the intellectual tone of society, at cultivating the public mind, at purifying the national taste, and at supplying true principles to popular enthusiasm." Doubtless this ideal has often failed of realization under the old *régime*, but it should ever be kept in view. Cambridge, indeed, ought always to be more than "a commercial academy," or "a useful knowledge shop," as Lord Grimthorpe protests. Even if for a time the bread-and-butter studies do prevail, a healthful reaction may be counted upon. Then it will be found, no doubt, that classical culture will not perish from the earth, but, stripped of its artificial supports, will stand all the more erect because its strength is its own.

NEWS FROM ABROAD.

ENGLAND.

COMPULSORY GREEK.

It is not often that the Cambridge Senate attracts so much attention outside the University as was bestowed on it during October, and especially on the 29th, when by the overwhelming majority of 525 to 185 it rejected the "Grace" proposing "that a Syndicate be appointed to consider whether it be expedient to allow alternatives, and, if so, what alternatives, for one of the two classical languages in the Previous Examination, either to all students or to any classes of students other than those already exempted." The object of the proposal, as stated by most of its friends, was to abolish Compulsory Greek, to make it an optional subject for a degree in Arts: it is now such only for students from oriental countries and possibly for a few Scottish students received by incorporation. When we consider the possible effect of such a change on all first-grade schools throughout the United Kingdom, it is not surprising that the vote was the largest ever taken in the Senate, and that for days beforehand the London papers had devoted several columns to articles and letters intended to influence the result. The question of Compulsory Greek at the universities is in fact one which touches the schools and the general public more nearly than the universities themselves, as is shown by the prominence of certain head-masters among the supporters of the "Grace," notably Dr. Welldon of Harrow and the Hon. and Rev. E. Lyttelton of Haileyburg: it is, of course, a striking fact that such schools as Eton, Winchester, Marlborough, and Clifton are in favor of the change. Decisive as was the victory of the *non-placets*, it is not of course accepted as final. No doubt some little time will elapse before the question is reopened in the same manner in Cambridge. But the opponents of Compulsory Greek are not conciliated by the fact that they were beaten at the first stage, — that of inquiry. It is said that to vote down a demand for inquiry is an extreme measure, and it is likely that it will afford a pretext for returning to the attack earlier than might otherwise have seemed proper. On the other hand, it is alleged that the committee of inquiry would, if appointed, have been composed of persons favorable to the main contention; also that in such a case inquiry is always open. It was indeed stated that the object was to obtain the general opinion of head-masters. But that had been given at their con-

ference held at Oxford in December of last year, when, in spite of the arguments of the accomplished translator of Aristotle's *Rhetoric*, a similar proposal, unkindly nicknamed the "Modern Side Relief Bill," met with a negative. This, however, is a matter of tactics. It is more interesting to consider estimates of the consequences to higher education, should Greek at some future time become optional at the two older universities.

The head-master of Wellington, where there is a larger Modern Side in proportion to the total numbers than in any other public school, thinks that Greek might be dispensed with for a degree in which mathematics and science are the staple, but not for a literary degree: to grant the latter would "sweep the study of Greek out of all schools except the few which by force of tradition and endowments may be able for a time to resist the current." Mr. Wickham also says he has never known the little Greek now required prove a real barrier. The head-master of a school of a different type, King's College School, London, takes a similar view on both points. Though very successful with his Modern Side, Mr. Bourne is not prepared to support the abolition of Compulsory Greek at the universities, thinking it "would more and more tend to make boys shirk the learning of Greek in favor of the more attractive French or German, and the result would be that in a few years there would not be forty schools in the Kingdom in which Greek would be taught." Mr. Keeling of Bradford Grammar School is of the same opinion. The real question, according to Mr. Bourne, is "whether for the sake of conferring a doubtful benefit on a few, we should practically remove Greek from the curriculum of all but a few of the larger schools." And, of course, if Greek is necessary to the highest education, it ought to be accessible to all capable boys in every grammar school throughout the country.

The extent of the calamity which some think would overtake us, should the study of Greek be generally discontinued, may be inferred from several brilliant appeals lately circulated in Cambridge, especially from those of Professor Jebb and Mr. J. K. Stephen; and these appeals will no doubt cross the Atlantic. The main question, however, is one of practical school education, and the most striking (though not the most recent) summary I have seen of the whole of it, from the point of view of a supporter of the change, is a paper, one of "Thirteen Essays on Education" (Percival & Co.), by the head-master of Haileyburg. Mr. Lyttelton regrets the confusion of issues at the Head-Masters' Conference before mentioned, to which, as a spectator, I can bear witness, and arranges the conservative arguments under the following heads: (1) Difficulties of reorganization in the universities; (2) that Greek is a grand educational instrument; (3) that it is the language of the first liter-

ature in the world; (4) that it is necessary for scientific terminology; (5) and for a study of the New Testament; (6) that it promotes exact thought; (7) and a philosophic mind; (8) that there is no good substitute; (9) that the concession would be to boys' wishes, not to their interests. In point of logic this arrangement leaves something to be desired, as Mr. Lyttelton was no doubt aware; nor does he adhere strictly to it in his own argument. The difficulties of university organization he would leave with confidence to the universities. The educational benefits claimed for Greek he divides under two heads, "gymnastic" and "literary," contending that the first kind would be given by Latin alone, and that the second is never reached except by a very small minority. He would by no means abolish Latin, nor would he substitute for Greek either a modern language (except for mere utility) or science. He would give the time gained to history, geography, and English. He would do this, not on the modern side, where boys are mostly destined for other pursuits, but for those who are going to the university and who now learn Greek: he is therefore not open to the charge of promoting a Modern Side Relief Bill. As to the New Testament, he seems to think that most clergymen can do well enough with the Revised Version and commentaries; and as to scientific terminology, he replies that most scientific specialists know no Greek, and are content. He notices that "an appeal *ad misericordiam* has been made by head-masters of the smaller schools." But he believes that they will be protected by diminishing (as proposed) "the force of the attack now being made upon classics," by university regulations and scholarships, and by the inherent value of Greek. He does not, so far as I see, deal with the argument that the masters themselves in small schools will in a few years know no Greek, and therefore be incapable of teaching it even to their ablest pupils. I quote the following to illustrate his general position. If "nothing is done, all sections of reformers and faddists and short-sighted worldlings will combine in the cry for change till they hound the classics from the field: the reformers, because they know the mass of boys cannot possibly study two ancient languages with profit; the faddists, because they prefer geology, electricity, or Icelandic; the worldlings, because they despise culture and love cash. A long delay will cement these parties into an unholy and unnatural alliance."

Mr. Lyttelton is indeed representative of a party which suffers from its friends. He desires in the interests of literature that on certain conditions an alternative should be allowed to one of the classical languages; but he is joined with those who would dispense with both altogether, and who have not been conspicuously devoted to any literary study whatever. He votes with men who know little Greek and teach none, and who resemble the tailless fox advising others to dock themselves. If

Mr. Lyttelton can free himself from the suspicions attaching to this alliance, and prove his case to the friends as well as to the enemies of the classics, he may soon prevail; and the *Times* declares that the change will be forced by public opinion. But for the present the *non-placets* triumph and would say κεῖται . . . ὡς ἀπόλοιτο καὶ ἄλλος; "so perish likewise all who work such deeds."

T. W. HADDON,

Formerly Scholar of University College, Oxford; Composition Master at the City of London School.

LONDON, November, 1891.

FRANCE.

EDUCATIONAL NEWS.

The writer who deals with the subject of education in France has, in many respects, a more difficult task than has he who reports the educational matters of any other country. To what is this due? To be sure, French schools are as well organized as any; the teachers are as well prepared for their work, for each one has received a thorough normal training. Dr. Brooks, Superintendent of Schools in Philadelphia, calls the French school system the nearest to perfection he has yet seen. But, nevertheless, there is something in the French school that is very unsatisfactory to the teacher and to the superintendent. Something is lacking; the education gained is not what it should be. To an American this lack seems to be due to the worst of the national characteristics of the French people, — a mercurial and impulsive temperament, superficiality, pride, and self-conceit. The cry of the teacher is, "As soon as the student is admitted to the high school or the college, he becomes lazy. He thinks the fact of his admission proves him a good scholar and that he has no more to do." The complaint is national. The indifference to questions of the day, except those of narrow partisan or mistaken patriotic feeling, the absolute ignorance of modern languages and history, and the revolt from the old "classical" instruction, have come to be recognized by the educational authorities as the great evils that must be remedied; and with a firm spirit of determination M. Bourgeois, Minister of Public Instruction, has faced the situation and is vigorously fighting the battle, the victorious issue of which is already foretold.

Here, as elsewhere, education is an experimental science, but at the same time it is a science so approximately exact that the results of a given experiment may be pretty accurately predicted. And when the Minister of Public Instruction proposes, and puts his proposition into

effect, to substitute modern languages and science for Greek and Latin, to teach these modern languages by the methods that will train the same analytical and logical faculties that were educated by the study of the dead Greek; when the intention is not to form mere commercial or technical schools, but liberally to educate, can we doubt the successful result of the experiment?

As reconstructed, the course of instruction in institutions of the grade of our high schools and colleges will comprise: first, and in the eyes of French educators most important, French composition, rhetoric, and literature; next, in point of training and practicability, mathematics, physics, chemistry, and astronomy; then, in place of Greek and Latin, English and German so studied as to make the student familiar with the best productions of their literatures at first hand, a task by no means so arduous as to attempt to introduce him to the beauties of Homer and Virgil; also increased attention to geography and history, especially modern history, to political economy and the elements of law, ethics, and philosophy in about the usual proportion. Can such an education be less "classical" than the old?

In America this "ancient or modern" problem is old and by some schools and colleges satisfactorily solved, yet surely all will watch with interest the revivifying of French education and scholarship so ardently expected here.

In the Budget for 1892, the Minister of Public Instruction asks for an increase upon the sum last year devoted to the secondary education of women, both for founding new institutions and for bettering the modes of instruction. The secondary education of women definitely began in France in 1883 with the opening of the Lycée Fénelon at Paris. It has increased immensely though unsteadily. In 1883 there were nine lycées for women; to-day there are 23. In 1884 there was an average of 170 pupils to each school. In 1885 four new colleges had the effect of reducing the average to 160. The number mounted again in 1886 to 172, about the present average. In addition, there are 25 female colleges, with over 3000 pupils. This number, joined to that of the students in other secondary courses, makes a total of over 10,000 young women who are receiving a superior education in France. An enormous majority of these students are daughters of the middle classes, who are studying not merely to become scholars, but to gain such knowledge as will enable them to procure a livelihood. It is much to be regretted that the influence that the higher social classes might exert is almost totally absent. Why is it? Religious feeling has much to do with the answer; so too has vanity and society exclusiveness. This great problem of female education is confessedly not yet so well solved in France as in America.

During October, the month of examinations here, educational circles were discussing the abolition of examinations in secondary schools, proposing to leave it to the different departments of the university to examine the fitness of the students who apply for admission to their courses. This question, asked six years ago and presumably answered for a longer period, seems definitely settled when a majority of those in charge of French lycées, colleges, and universities report that they believe that there should exist a final examination at the end of the pupil's career in the secondary school, and, very important in the eyes of freedom-loving, democratic France, that this examination should be made public, the same for all, and held before a jury enrolled from among the instructors in secondary schools. They believe that the baccalaureate, the natural end of secondary studies, has for its essential object to prove that the course of these studies has been followed by the pupil with a sufficient profit, that the diploma of the bachelor should be considered a necessary guarantee of a good education, and should suffice for the entrance to the university courses in law, medicine, science, and letters. This question of examinations is one that is not likely to arise in America, because neither our high schools, colleges, nor universities are under national control, and uniformity of acquirement and requirement is impossible.

An innovation was made this year in making the day of the reopening of the schools after the long vacation a fête day, — we might be allowed to say a holiday. Instead of reading the rules of the school to the students and assigning lessons, the masters made use of this, the first day of the school year, to show the agreeable side of student life, to become acquainted with their pupils, to chat familiarly with them, to encourage the old and to show the new that they have nothing to fear. This has gone far towards inspiring confidence, towards securing the very end that the teacher wishes, that the pupil should work with a gay heart and tranquil mind, and so accomplish more than if he had the perpetual fear of a possible punishment.

A circular of the Minister of Public Instruction announces that the price of education at the lycées, which has already been reduced in the lower divisions, will be diminished in the superior as well. This reform cannot be too strongly commended. Before this present year the attempts at reduction have been on the other side, the lessening of expenses to the school. This more far-seeing policy will prove itself in the right by the increase in the number of pupils.

At the last meeting of the Academy of Sciences M. Charles Brougniart read a notable paper on the metamorphoses of the pilgrim locust (*Acridium perigrinum*). It was not only interesting to scientific listeners, but was written in so pleasing and popular a way as to call the

attention of young students to the habits of these little creatures. Why should not more of our own educators and scientists write not merely for themselves and their own generation, but at the same time for the young?

There are now in the colleges of France over 3000 professors, and the Minister of Public Instruction proposes this year to make 700 promotions from instructorship to professorship, or from one grade of professorship to a higher. For in 1890 only 83 promotions were made, and at that rate it would take the average professor 37 years to receive one promotion, and one of the fourth class 111 years to reach the first class.

The notable French educational books of the month are Balestre's Course of Practical Hygiene, and Aubry's Essay on the Method of Ecclesiastical Studies in France.

FRED PARKER EMERY,
Instructor in English in the Mass. Institute of Technology.

PARIS, November, 1891.

HOME NEWS.

COLLEGE ATTENDANCE, 1890–1891.

THIS table is compiled from statistics furnished by officials of the several colleges. The figures for 1891 were supplied on or near November 1; those for 1890, in most cases, include all who were students in the institutions named, within the college year 1890–1. In several instances the absence of detailed statistics concerning the four classes, indicates the absence of the old system of classification. The column headed "Others" includes special students, post graduates, and professional students. Wherever it is known to include preparatory students, the fact has been indicated by the sign †. Losses are indicated by the sign *.

NAME AND LOCATION.		Fresh	Soph.	Jun.	Sen.	Others	Total.	Gain.
Alabama Agricultural and Mechanical College, Auburn, Ala.	1891	44	74	36	36	†38	†227	*11
	1890	77	58	47	21	†35	†238	....
Los Angeles University, Los Angeles, Cal.	1891	....	....	....	....	.....	83	....
	1890	....	....	....	....	.....	83	....
Leland Stanford, Jr., University, Menlo Park, Cal.	1891	365	35	30	25	25	480	480
	1890	0	0	0	0	0	0	....
University of Denver, Denver, Col.	1891	7	5	2	6	11	31	5
	1890	8	5	6	3	4	26	....
State Agricultural College of Colorado, Fort Collins, Col.	1891	50	14	11	10	29	114	47
	1890	28	18	9	3	9	67	....
Trinity College, Hartford, Conn.	1891	23	33	36	23	6	121	*11
	1890	25	41	24	31	11	132	....
Wesleyan University, Middletown, Conn.	1891	70	63	47	63	20	263	10
	1890	77	53	65	41	17	253	....
Yale University, New Haven, Conn.	1891	268	248	197	180	891	1784	139
	1890	259	201	185	187	813	1645	....
Columbian University, Washington, D. C.	1891	....	....	....	....	.....	820	120
	1890	....	....	....	....	.....	700	....
Howard University, Washington, D. C.	1891	....	....	....	....	.....	554	120
	1890	....	....	....	....	.....	434	....
Emory College, Oxford, Ga.	1891	55	51	60	35	†52	†253	*2
	1890	41	75	38	33	†68	†255	....
University of Illinois, Champaign, Ill.	1891	185	136	73	53	98	545	49
	1890	....	....	....	....	.....	496	....
St. Ignatius College, Chicago, Ill.	1891	....	....	....	....	255	309	31
	1890	....	....	....	....	227	278	....
Northwestern University, College of Liberal Arts, Evanston, Ill.	1891	....	....	....	....	.....	413	84
	1890	....	....	....	....	.....	329	....
Knox College, Galesburg, Ill.	1891	....	....	....	....	.....	.....	....
	1890	74	57	39	55	†421	†646	....
Lake Forest University, College Department, Lake Forest, Ill.	1891	17	13	23	13	37	103	15
	1890	12	22	10	10	34	88	....
Lincoln University, Lincoln, Ill.	1891	25	18	5	8	78	124	29
	1890	18	6	8	6	57	95	....
North Western College, Napoleonville, Ill.	1891	15	13	12	2	175	217	33
	1890	5	11	7	3	158	184	....

Name and Location.		Fresh.	Soph.	Jun.	Sen.	Others	Total.	Gain.
The Indiana University,	1891	120	78	52	50	55	355	20
Bloomington, Ind.	1890	120	60	54	64	37	335	...
Franklin College,	1891	25	23	13	13	126	200	15
Franklin, Ind.	1890	31	19	13	12	110	185	....
Hanover College,	1891	45	35	25	20	60	185	....
Hanover, Ind.	1890	50	27	24	7	.....	.....	....
Union Christian College,	1891	17	11	6	3	73	110	21
Merom, Ind.	1890	15	9	8	8	59	89	....
University of Notre Dame,	1891	....	....	....	....	.....	535	18
Notre Dame, Ind.	1890	....	....	....	....	.....	517	....
Iowa Agricultural College,	1891	169	79	67	43	67	425	89
Ames, Iowa.	1890	137	60	55	43	41	336	....
Norwegian Lutheran College,	1891	17	18	16	11	†103	†165	2
Decorah, Iowa	1890	25	21	11	9	†97	†163	....
Upper Iowa University,	1891	35	19	20	22	374	470	*6
Fayette, Iowa	1890	38	34	23	19	362	476	....
Oskaloosa College,	1891	12	10	6	3	31	62	*13
Oskaloosa, Iowa.	1890	10	6	3	4	52	75	....
Western College,	1891	26	8	10	9	†104	†157	18
Toledo, Iowa.	1890	19	7	11	12	†90	†139	....
State Agricultural College,	1891	251	127	60	40	10	488	21
Manhattan, Kas.	1890	238	115	54	52	8	467	....
Eminence College,	1891	26	44	12	9	11	102	15
Eminence, Ky.	1890	30	35	18	4	.....	87	....
Kentucky Wesleyan College,	1891	....	....	....	....	.....	120	25
Winchester, Ky.	1890	....	....	....	....	.....	95	....
New Orleans University,	1891	2	1	1	0	462	466	84
New Orleans, La.	1890	4		2	4	372	382	
Tulane College, of Tulane University,	1891	43	28	15	16	13	115	15
New Orleans, La.	1890	33	23	18	7	19	100	....
Bowdoin College,	1891	53	42	34	40	103	272	5
Brunswick, Me.	1890	48	39	41	53	86	267	...
Bates College,	1891	53	38	38	21	.....	150	4
Lewiston, Me.	1890	44	44	25	33	.....	146	....
Colby University,	1891	52	63	37	31	.....	183	7
Waterville, Me.	1890	69	43	33	31	.....	176	....
St. John's College,	1891	27	22	19	11	62	141	3
Annapolis, Md.	1890	25	20	24	7	62	138	....
Johns Hopkins University,	1891	....	....	....	....	295	501	96
Baltimore, Md.	1890	....	....	....	....	214	405	....
Washington College,	1891	21	12	6	5	40	84	5
Chestertown, Md.	1890	23	10	7	4	35	79	....
Mt. St. Mary's College,	1891	50	35	18	16	35	154	4
Mt. St. Mary, Md.	1890	45	31	20	12	42	150	....
Amherst College,	1891	84	70	91	84	6	335	*17
Amherst, Mass.	1890	73	100	90	84	5	352	....
Massachusetts Agricultural College,	1891	41	55	26	22	2	146	....
Amherst, Mass.	1890	62	35	27	20	2	146	....
Boston University, School of Liberal	1891	71	67	52	53	62	305	*21
Arts, Boston, Mass.	1890	72	68	44	49	93	326	....
Harvard University,	1891	383	321	301	268	1377	2650	379
Cambridge, Mass.	1890	366	389	254	289	973	2271	....
Smith College,	1891	206	158	115	86	77	642	91
Northampton, Mass.	1890	182	131	94	79	65	551	....
Mt. Holyoke Seminary and College,	1891	96	69	66	43	11	285	17
South Hadley, Mass.	1890	103	51	53	54	7	268	....
Tufts College,	1891	28	17	10	16	109	180	25
Tufts College, Mass.	1890	17	9	16	12	101	155	....
Wellesley College,	1891	205	135	125	117	106	688	*8
Wellesley, Mass.	1890	209	149	123	115	100	696	....
Williams College,	1891	117	76	76	84	84	356	45
Williamstown, Mass.	1890	80	80	88	60	3	311	....

NAME AND LOCATION.		Fresh	Soph.	Jun.	Sen.	Others	Total.	Gain.
Clark University,	1891	....	....	....	....	.....	75	10
Worcester, Mass.	1890	....	....	....	....	.....	65	....
College of the Holy Cross,	1891	51	51	36	29	131	298	15
Worcester, Mass.	1890	55	47	30	29	122	283	....
Mich. State Agricultural College,	1891	100	90	50	25	.....	265	*30
Agricultural College, Mich.	1890	113	102	43	37	.....	295	....
University of Michigan,	1891	....	....	....	....	.....	....	....
Ann Arbor, Mich.	1890	....	....	....	....	1508	2420	....
Detroit College,	1891	23	17	12	6	245	303	38
Detroit, Mich.	1890	19	18	7	7	214	265	....
Hillsdale College,	1891	31	25	20	25	164	265	*9
Hillsdale, Mich.	1890	29	19	23	19	184	274	....
University of Minneapolis,	1891	170	139	87	73	639	1108	201
Minneapolis, Minn.	1890	200	....	....	....	.....	907	....
Carleton College,	1891	36	17	19	13	13	98	6
Northfield, Miss.	1890	31	24	13	15	9	92	....
Agricultural and Mechanical College of	1891	80	31	21	21	118	271	26
Mississippi, Agricultural Col., Miss.	1890	61	29	22	13	120	245	....
University of the State of Missouri,	1891	....	....	....	....	....	659	100
Columbia (and Rolla), Mo.	1890	....	....	....	....	.....	559	....
William Jewell College,	1891	50	31	22	16	2	121	4
Liberty, Mo.	1890	51	25	18	19	4	117	....
Park College,	1891	30	31	32	20	0	113	15
Parkville, Mo.	1890	25	35	25	10	3	98	....
Washington University,	1891	40	20	11	22	9	102	*3
St. Louis, Mo.	1890	34	20	29	17	5	105	....
University of Nebraska,	1891	122	52	42	35	379	630	137
Lincoln, Neb.	1890	71	47	35	30	310	493	....
Nebraska Wesleyan University,	1891	18	16	12	6	†163	†215	45
University Place, Neb.	1890	16	12	6	4	†132	†170	....
University of Nevada,	1891	40	35	10	4	55	144	17
Reno, Nev.	1890	34	22	3	0	68	127	....
Wells College,	1891	24	9	6	7	29	75	*7
Aurora, N. Y.	1890	22	8	7	6	39	82	....
St. Lawrence University (College),	1891	30	19	14	12	22	97	14
Canton, N. Y.	1890	18	14	13	17	21	83	....
Cornell University,	1891	438	317	234	197	303	1489	99
Ithaca, N. Y.	1890	377	317	251	173	272	1390	....
College of St. Francis Xavier,	1891	41	17	17	14	271	360	27
New York, N. Y.	1890	36	23	20	14	240	333	....
Vassar College,	1891	119	76	49	55	99	398	73
Poughkeepsie, N. Y.	1890	83	56	52	36	98	325	....
Union College,	1891	80	34	34	21	11	180	21
Schenectady, N. Y.	1890	48	58	30	13	10	159	....
Davidson College,	1891	54	37	21	19	15	146	33
Davidson, N. C.	1890	45	28	19	11	10	113	....
Trinity College,	1891	63	39	16	18	70	206	48
Durham, N. C.	1890	38	26	20	12	62	158	....
University of North Dakota,	1891	11	6	7	....	†168	†192	75
University, N. D.	1890	8	7	0	5	†97	†117	....
Ohio University,	1891	27	18	20	17	81	163	49
Athens, O.	1890	....	....	....	11	.....	114	....
Adelbert College of Western Reserve	1891	28	22	13	10	13	86	6
University, Cleveland, O.	1890	28	18	11	15	8	80	....
Capital University,	1891	26	28	16	13	61	144	*2
Columbus, O.	1890	33	23	14	9	67	146	....
Ohio State University,	1891	134	66	40	31	314	585	92
Columbus, O.	1890	89	52	29	27	296	493	....
Ohio Wesleyan University,	1891	120	105	85	90	520	920	24
Delaware, O.	1890	115	80	95	90	516	896	....
Kenyon College,	1891	16	11	4	9	140	180	16
Gambier, O.	1890	12	7	10	4	131	164	....

Name and Location.		Fresh	Soph.	Jun.	Sen.	Others	Total.	Gain.
Oberlin College,	1891	63	121	71	50	†1030	†1335	*374
Oberlin, O.	1890	219	148	91	74	†1177	†1709	....
Heidelberg University,	1891	37	25	39	30	158	279	*21
Tiffin, O.	1890	29	32	31	30	178	300	....
Otterbein University,	1891	33	29	12	24	†104	†202	34
Westerville, O.	1890	30	20	24	10	†84	†168	....
Wilmington College,	1891	15	15	4	5	74	113	16
Wilmington, O.	1890	13	10	6	8	60	97	....
University of Wooster, Col. Dept.,	1891	76	58	40	42	.....	216	*18
Wooster, O.	1890	75	64	47	48	.....	234	....
West. Univ. of Pa., Acad. and Engineering Dept., Allegheny City, Pa.	1891	53	40	26	18	2	139	47
	1890	36	28	15	12	2	93	....
Muhlenberg College,	1891	24	20	22	15	39	120	*22
Allentown, Pa.	1890	24	28	15	17	58	142	....
Lebanon Valley College,	1891	15	16	13	13	23	80	*4
Annville, Pa.	1890	17	14	12	10	31	84	....
Beaver College,	1891	15	8	7	7	53	90	....
Beaver, Pa.	....	....	....	....	....	.....	.....	....
Geneva College,	1891	....	....	....	....	.....	141	25
Beaver Falls, Pa.	1890	....	....	....	....	.....	116	....
Bryn Mawr College,	1891	48	....	....	....	.....	158	21
Bryn Mawr, Pa.	1890	49	....	....	....	.....	137	....
Lafayette College,	1891	94	63	52	41	40	290	*29
Easton, Pa.	1890	94	72	50	63	40	319	....
Pennsylvania College, Prep. Dept.,	1891	....	....	....	....	†45	.....	....
Gettysburg, Pa.	1890	....	....	....	....	†50	.....	....
Thiel College,	1891	7	19	14	15	.....	55	*12
Greenville, Pa.	1890	16	19	20	12	.....	67	....
Haverford College,	1891	24	26	20	21	9	100	*1
Haverford College, Pa.	1890	29	26	26	8	12	101	....
Franklin and Marshall College,	1891	28	42	31	29	.....	130	4
Lancaster, Pa.	1890	30	35	34	27	.....	126	....
Allegheny College,	1891	44	39	30	33	68	214	*7
Meadville, Pa.	1890	48	42	32	39	70	221	....
University of Pennsylvania,	1891	132	77	129	80	1255	1673	107
Philadelphia, Pa.	1890	107	89	108	72	1087	1566	....
Swarthmore College,	1891	71	47	37	22	25	202	2
Swarthmore, Pa.	1890	60	51	26	26	37	200	....
Villanova College,	1891	30	27	25	20	0	102	....
Villanova, Pa.	1890	....	....	....	....	.....	.....	....
Washington and Jefferson College,	1891	39	36	33	37	.....	145	*13
Washington, Pa.	1890	46	36	41	35	.....	158	....
Brown University,	1891	88	92	61	59	99	399	47
Providence, R. I.	1890	103	71	59	60	59	352	....
South Carolina Col., Columbia, S. C.	1891	20	22	19	15	20	96	*64
Univ. of S. C., Columbia, S. C.	1890	28	21	20	28	63	160	....
Erskine College,	1891	21	16	14	11	20	82	5
Due West, S. C.	1890	17	14	12	13	21	77	....
Furman University,	1891	....	....	....	....	.....	142	*18
Greenville, S. C.	1890	....	....	....	....	.....	160	....
Newberry College,	1891	30	10	11	9	35	95	*5
Newberry, S. C.	1890	29	13	9	7	42	100	....
Wofford College,	1891	67	41	14	30	0	152	14
Spartanburg, S. C.	1890	57	29	33	19	0	138	....
King College,	1891	....	....	....	....	.....	.....	....
Bristol, Tenn.	1890	....	....	....	....	.....	96	....
University of Tennessee,	1891	64	50	25	15	16	170	....
Knoxville, Tenn.	1890	....	....	....	....	.....	.....	....
Carson and Hewman College,	1891	12	11	3	6	225	257	4
Mossy Creek, Tenn.	1890	20	13	6	....	214	253	....
University of the South,	1891	....	....	....	....	.....	270	22
Sewanee, Tenn.	1890	....	....	....	....	.....	248	....

Name and Location.		Fresh	Soph.	Jun.	Sen.	Others	Total.	Gain.
University of Texas,	1891	....	....	....	....	83	333	53
Austin, Texas	1890	....	....	....	....	77	283	....
Trinity University,	1891	33	27	10	....	†180	†250	22
Tehuacana, Texas	1890	25	14	6	....	†183	†228	....
University of Deseret,	1891	10	3	2	2	318	335	....
Salt Lake City, Utah	1890	....	....	....	....	....	....	....
Randolph Macon Col. and Academy,	1891	....	....	....	....	....	†290	30
Ashland, Va	1890	....	....	....	....	....	†260	....
University of Virginia,	1891	....	....	....	....	....	482	41
Charlotteville, Va	1890	....	....	....	....	....	441	....
Hampden-Sidney College,	1891	39	44	25	30	10	148	1
Hampden-Sidney, Va	1890	43	33	32	19	20	147	....
Washington and Lee University,	1891	....	....	....	....	....	230	....
Lexington, Va	1890	....	....	....	....	....	230	....
Richmond College,	1891	....	....	....	....	....	172	*26
Richmond, Va	1890	....	....	....	....	....	198	....
University of Vermont, Academic Dept.,	1891	53	49	47	16	26	191	13
Burlington, Vt	1890	59	48	19	31	21	178	....
Middlebury College,	1891	29	19	17	4	0	69	15
Middlebury, Vt	1890	20	19	4	11	0	54	....
Bethany College,	1891	60	23	17	17	33	150	....
Bethany, W. Va	1890	57	21	19	16	37	150	....
Lawrence University, Academic Dept.,	1891	33	20	11	10	92	166	13
Appleton, Wis	1890	20	14	10	13	121	179	....
Beloit College,	1891	33	28	29	21	2	113	4
Beloit, Wis	1890	32	23	23	26	5	109	....
University of Wisconsin,	1891	241	190	141	83	191	846	46
Madison, Wis	1890	241	168	102	95	184	800	....
Ripon College,	1891	9	10	7	4	6	36	4
Ripon, Wis	1890	12	7	4	5	4	32	....
Northwestern University,	1891	16	12	10	10	0	48	....
Watertown, Wis	1890	11	11	15	11	0	48	....

LETTERS TO THE EDITOR.

THE NEW VENTURE.

To the Editor of School and College:—

I see by the prospectus issued by Messrs. Ginn & Company that you are to edit a new educational magazine, to be called "SCHOOL AND COLLEGE."

I am heartily glad of this, for there is a field for just such a magazine without trenching upon that of any existing periodicals.

Education, it is true, has its field, and it is an important one. *The Educational Review*, *The Academy*, and *The Public School* all have their mission and they all ought to be supported more liberally than they are. Then the several general and local, weekly and monthly papers, such as *The Journal of Education*, *The New York School Journal*, *Common School Education and Teachers' World*, *The Popular Educator*, and others, all are helping in their several directions the teachers in their work, but it still remains true that there is a large place to be filled by your new magazine. The idea seems to me to be too generally prevalent among teachers that we have too many educational journals. I do not think this is the case. We may have too many daily and weekly newspapers, and yet, perhaps not.

Have we too many magazines like *Harper's*, and *Scribner's*, and *The Century?* or the *Forum*, the *North American Review*, and the *Atlantic Monthly?* Does not every one know that by the multiplying of these great monthlies the amount of the higher class of reading done by the American people has been increased and improved many fold? Surely such has been the case.

The great difficulty in the past has been that the educational periodicals have not been sufficiently strong and talented to command the largest subscription lists and the highest respect. But their multiplication inevitably demands a higher quality, as it brings a sharper competition.

There is another feature that may be mentioned in considering the launching of your new venture. Its name implies its mission — "School and College." No more important question is, perhaps, now before the educational world of America than the question implied in this name.

Our primary education, in methods, scope, and aims, has been wonderfully improved since some of us older men in the field were schoolboys.

We have now fallen upon times when the whole question of secondary and superior education *needs* to be discussed from the very highest ground, and we need to go down to the deepest principles and build upon the very broadest foundations.

I rejoice that you are going to take up this work and I shall look for important results to grow out of your new venture.

With great respect, I am, sincerely yours,

WILLIAM A. MOWRY.

SALEM, MASS., November 30, 1891.

THE EARLIER STUDY OF PHILOSOPHY.

To the Editor of School and College: —

In thanking you for the opportunity of reading, in advance of publication, Mr. Burt's article entitled "When should the Study of Philosophy begin?" I wish to express my own hearty accord with the conclusions he has reached.

The traditional error that philosophy is a study suitable only for mature minds, comprehensible to but a few of the elect, and of practical value to none, is rapidly yielding to a more just estimate of its importance in an educational system, as teachers improve in ability to make themselves understood by their pupils. It has been supposed that philosophical principles could be expressed only in vague and mystical terminology, and such a view is not without justification. Other branches of learning have their technical vocabularies, and why not philosophy? And since the philosopher deals with abstractions, he naturally expresses his processes in abstract terms. I believe, however, that there is a large field of resources still unexplored by philosophical teachers, in which methods are to be discovered expository of the technical terminology, necessarily so abstruse, and more suitable for guiding the philosophical thinking of minds in an early stage of development.

In order that philosophy may fulfil its function of correcting crude and erroneous methods of thought, of unifying knowledge and of developing character, the teacher of the future must succeed better than his predecessors, in leading the mind of the pupil to make the important *applications* of philosophical principles. An invaluable means towards attaining this end, judging from results which have come under my observation,[1] is the method of *illustration*. Let the abstract principles under dis-

[1] At Wellesley College an outline course in philosophy, one hour per week, is open to freshmen.

cussion be presented in concrete forms, drawn from the material most familiar to the pupil through other studies.

The physical sciences reveal the world of external nature as an inexhaustible storehouse of symbol and prototype of higher truth; history and literature furnish examples of every conceivable phase of psychic activity in thought and conduct; and from all the departments of the fine arts — where truth is expressed in forms of beauty — innumerable masterpieces may be selected for presenting abstract principles in embodiments which, by appealing to the pupil's imagination, secure his attention and interest.

To sum up: I would make a twofold plea, — first, for philosophical study in the later high school and early college years; and secondly, for a method of instruction which should make such study possible.

ESTELLE M. HURLL.

NEW BEDFORD, MASS., November 14, 1891.

TWO PRACTICAL QUESTIONS.

To the Editor of School and College: —

I recently saw your announcement of SCHOOL AND COLLEGE, in which you invite suggestions, and I venture to offer the following.

Two questions were asked me recently by friends about the education of their boys. I would like to see what answers your readers would give to them. I gave my own at once, but have no particular confidence in them. Here are the questions:

1. I am foreman in Curtis Sons' bindery, New York, receiving as salary $25 a week. I have a wife and three boys. We live in a flat on Madison Avenue and 112th Street. What is the most practical education for me to give my boys?

2. I am department manager in Hurlburt & Co.'s (wholesale drugs and perfumes). My salary is $25 a week. I have a wife and three children. We own our house in the back of Brooklyn. What is the best education to give my boy to enable him to fight the world as he will find it? He is now five years of age, and must leave school probably at seventeen or eighteen.

With great respect, yours very truly,

IRVING G. STANTON.

NEW BEDFORD, MASS., December 11, 1891.

REVIEWS.

Conduct as a Fine Art. The Laws of Daily Conduct, by NICHOLAS PAINE GILMAN. Character Building, by EDWARD PAYSON JACKSON. Boston, Houghton, Mifflin & Co., 1891. — $7\frac{3}{4} \times 5$ in., pp. 149 and 230.

In the fall of 1889 the American Secular Union offered a prize of one thousand dollars "for the best essay, treatise, or manual adapted to aid and assist teachers in our free public schools to thoroughly instruct children and youth in the purest principles of morality without inculcating religious doctrines." The prize was divided between Mr. Gilman and Mr. Jackson, whose two books were judged to be complementary of each other, and are published together under the title above. Mr. Gilman has cast his thoughts in the form of a treatise on "The Laws of Daily Conduct," while Mr. Jackson has written in the form of a dialogue between a school-master and his pupils. After an excellent introduction on "Morals in the Public Schools," Mr. Gilman discusses in a somewhat general way the subjects usually treated in a work on ethics. He insists on the importance of truthfulness, justice, kindness, *etc.*, in part from the utilitarian standpoint, in part for reasons drawn from etymology, and in part by arguments based on duty. His fifteen chapters contain few statements from which one dissents, but the form in which long-accepted truths are moulded is not very new or interesting, and nowhere does the reader feel a glow of enthusiasm for the virtues inculcated. Perhaps the most useful part of the book is the "Notes" at the end of each chapter, referring in detail to the literature of the subject. Mr. Gilman has read well and reflected well, and if he has produced only a dull book, it must be remembered that it would be difficult to point to one that is better.

Mr. Jackson's dialogue, or ten-minute talks with pupils, is not exactly dull reading, though it is not enlivened by much humor. "For a teacher," as a school-girl said, Dr. Dix is interesting, and he gives much instruction that is valuable. He cannot wholly lay aside the besetting sins of his occupation, — priggishness and dogmatism. One feels, too, that an undue amount of attention is given to the remote aspects of immorality and to sins which "other persons" commit. Both these writers believe that morality cannot be taught by preaching or by maxims, but both make use of elaborate explanations of the nature and effects of sin, and neither has succeeded in showing to what extent instruction can be

given concretely. There is great reason to believe that a knowledge of the evil consequences of wrong-doing is not in a large measure operative as a restraining power, and it is doubtful if much is accomplished by forewarning children of particular sinful acts or habits which they may fall into when older. The indirect method of attempting to produce a state of feeling which will react when allurements to vice are presented has much more to commend it. A certain capacity for morality is inborn, which can be increased by the formation of moral habits, and moral habits in children are chiefly induced by feeling. Whatever appeals to the emotions, either in the direction of enthusiasm for what is good or hatred for what is bad, may result in producing a permanent state out of which actions will proceed as from an instinct. Along this line more may be hoped for than can be gained by directing instruction to the intellect with the expectation of teaching young persons to avoid evil by thinking straight or reasoning correctly. "The excellent teacher of morals," Mr. Gilman says, "will be morality incarnate." However desirable this requirement may be, nothing can be more fatal to the influence of a teacher than to believe himself to be an example and model for his pupils. No teacher of insight will fail to find among his pupils individuals who are superior to him in certain respects. He will do well then in the fullest sincerity to place himself with his pupils and show himself what he would like to have them be, — a striver after better things than he has yet attained. Instead, for instance, of denouncing lies and liars, let him lay aside all affectation and sophistry and make use of his own petty falsehoods to illustrate what he means by untruthfulness. If he cannot find in his own history and nature instances of most of the petty sins which he reproves in his pupils, he has forgotten his childhood or is deceiving himself as to his present integrity.

ELLEN M. HASKELL.

STATE NORMAL SCHOOL, WORCESTER, MASS.

Ethics for Young People. By C. C. EVERETT, Bussey Professor of Theology in Harvard University. Boston, Ginn & Co., 1891. — 7½ × 5 in., pp. 185.

Leslie Stephen in his *Science of Ethics* speaks of the "alternate platitudes and subtleties into which every moralist must plunge." The danger in both these directions is vastly greater in a book on ethics for young people. For to them every principle will seem a subtlety, and to older people every precept fitted to the apprehension of the young must seem a platitude. With admirable skill Professor Everett has avoided these dangers, on one or the other of which nearly all previous attempts in this direction have been wrecked.

It is a boy's book through and through. The illustrations are drawn from the woodshed and the ball-ground, where boys meet their real trials and win the triumphs that they prize.

It blends theory and practice so adroitly, giving the reason with the precept and clothing the principle in flowing robes of anecdote and illustration, that it is never dry or heavy.

It appeals not to the abstract sense of moral obligation, but to the admiration for what is manly and brave, and the contempt for what is cowardly and mean, and thus gets hold of boys as they are, instead of giving a description of boys as they might be conceived to be. It has a place in its scheme of life for fun and frolic as well as for industry and obedience.

The strength and the weakness of the Epicurean and the Stoic views of life are presented with a clearness and fairness which makes these systems in their essential features easily intelligible to a boy or girl of twelve. And the youthful reader cannot fail to be led unconsciously a good way beyond the limits of these individualistic modes of thought by the hints and intimations of man's social nature introduced into the later portions of the book. Indeed, it would be hard to find anywhere a stronger and clearer exposition of the fundamental ethical doctrine that man is by nature a social being, and *unus homo nullus homo*, than is presented in the chapter on Relations to Others.

The book is the best thing of its kind we have seen. Whether it is possible to present the matter from a different point of view more effectively is a question worthy of consideration. This, like all other books on the subject, is written *at* the boys. It gives them advice and counsel. Yet we all know how reluctant boys are to take advice from any source. The ideal approach to the subject is one that should place the problem of life clearly before the boy's mind, and urge him to solve it for himself. Then it would take up the materials for its solution which nature, human society, and human institutions place at his disposal. Then it would show him how to use these materials so as to make the most of himself by means of them, and point out the dangers and penalties of disuse or abuse, and the rewards of duty and virtue in terms of character and life. By taking the boy into the author's confidence, and working with him for ends which the boy himself should have clearly before him as desirable, it might be possible to enlist his will in the work of self-realization with an intensity and enthusiasm which no direct advice can awaken. In a word, the most effective book on ethics will be that which shall succeed, not in telling the boy what the author sees to be good, but in showing the boy how to accomplish what the boy sees for himself to be best.

Professor Everett's book is constructed on the old plan of giving good

advice to the boy; but he has broken through the limitations of his method at so many points that he has produced substantially the impression of being, not the master laying down the law, but the guide pointing out the way, and the friend walking in it by his pupil's side.

WILLIAM DEWITT HYDE.

BOWDOIN COLLEGE, BRUNSWICK, ME.

The Present and Future of Harvard College. An address delivered before the Phi Beta Kappa Society at Cambridge, Mass., June 25, 1891. By WILLIAM WATSON GOODWIN, Eliot Professor of Greek Literature in Harvard University. Boston, Ginn & Co., 1891. — 8 × 5½ in., pp. 42. Paper.

Professor Goodwin's address has a very great interest because he has been devoted to the instruction in the University and only incidentally to the administration, and he is able to speak with almost greater authority than President Eliot himself of the educational changes wrought in Harvard College in the last twenty-five years. The candor and the modest earnestness of the address are on the face of it. The answer to the question "where are we now, and how did we get there?" being a question of history, is worked out more fully, but not more interestingly, than the second inquiry, "where are we going, and how do we expect to get there?" This is aim and prophecy.

The allusions to secondary education are not many in the first part. They turn on the failure of the secondary schools to prepare men to enter at once upon elective studies. The college is no place for elementary work of any kind, and yet the men "have not learnt enough at school," "they have not completed the general and preliminary studies which are necessary to a liberal education." At present "the college is better supplied with machinery than material"; "the remedy will come in time from much-needed reforms in school education."

Under the second head the most eloquent passages are those which vindicate the claims of liberal education to its full period of time between the improved schools below and the professional schools, including the Graduate school, above. Harvard College is to be maintained within the University for the historic and supreme purpose of providing the means of a truly liberal education for ambitious and capable youth who have been well prepared for it, and have reserved the time for it.

Professor Goodwin in defending the college idea could not ignore the pressing danger that the demand for early entrance upon a career will deter some men from taking the time for liberal culture, and he traverses familiar ground to show how far our boys are behind those of Germany, France, and England, or even the American boys of sixty years ago.

He leaves out of the account much that could be said to the contrary, but his main contention is one that all teachers in every grade of instruction must heartily approve. The schools must be improved.

CECIL F. P. BANCROFT.

PUBLICATIONS RECEIVED.

Academy, The. $1.50 per year. Boston, George A. Bacon.
BLODGETT, J. H. Some Things that need Correction.
BOLTWOOD, HENRY L. A Higher Speller. 30c. Evanston, Ill., Henry L. Boltwood.
Brown Daily Herald. Pub. at Brown University, Providence, R.I. $1.50 per year.
BRYN MAWR COLLEGE. Graduate Courses, 1891–92.
" " " President's Report, 1889–90.
" " " Program, 1891.
BUTCHER, S. H. Some Aspects of the Greek Genius. $2.25. New York, Macmillan & Co.
CHALMERS, GEORGE F. Pictorial Astronomy. $1.25. New York, Macmillan & Co.
CHURCH, ALFRED J. The Story of the Iliad. $1.00. New York, Macmillan & Co.
" " The Story of the Odyssey. $1.00. New York, Macmillan & Co.
Educational Review. $3.00 per year. New York, Henry Holt & Co.
FRIENDS' SCHOOL, Wilmington, Del. Catalogue 1891–92.
GATES, MERRILL E. How to Choose a College.
JOHNSON, CHARLES F. English Words. New York, Harper & Bros.
KING COLLEGE, Bristol, Tenn. Annual, June 10, 1891.
Lantern, The. Published at Bryn Mawr College.
MASSEE, GEORGE. The Plant World. $1.00. New York, Macmillan & Co.
MIDDLEBURY COLLEGE. Catalogue, 1891–92.
OBERLIN COLLEGE. Address at Inauguration of President.
" " Announcement, 1890–91, 2d edition.
PATTERSON, J. W. A Treaty of Arbitration. Concord, N.H. Rep. Press Asso.
PETERMAN, ALEX. L. Elements of Civil Government. New York, American Book Co.
PHILLIPS ACADEMY, Andover, Mass. Preliminary Catalogue, 1891.
PORTER, ROBERT P. The Eleventh Census.
Quarterly Register of Current History. $1.00 per year. Detroit, Ev. News Asso.
QUEEN'S COLLEGE AND UNIVERSITY, Kingston, Ont. Examination Papers, 1891.
" " " " " " Calendar, 1891–92.
RIBOT, TH. Tr. by J. Fitzgerald. The Diseases of Memory. 15c. New York, Humboldt Pub. Co.
RIBOT, TH. Translated by J. Fitzgerald. The Diseases of Personality. 15c. New York, Humboldt Pub. Co.
RIBOT, TH. Tr. by J. Fitzgerald. The Diseases of the Will. 15c. New York, Humboldt Pub. Co.
SEELYE, JUSTUS H. Duty. Boston, Ginn & Co.
SPENCER, HERBERT. Education. 30c. New York, Humboldt Pub. Co.
" " The Data of Ethics. 30c. New York, Humboldt Pub. Co.
TILDEN, JOHN N. A Commercial Geography. Boston, Leach, Shewell, & Sanborn.
TRECHMANN, EMIL. A Short Historical Grammar of the German Language. $1.00. New York, Macmillan & Co.
TULANE UNIVERSITY, New Orleans, La. Catalogue, 1890–91; Announcement for 1891–92.
UNIVERSITY OF MICHIGAN, Ann Arbor. Calendar, 1890–91.
Weekly Bulletin of Newspaper and Periodical Literature. $1.00 per year. Boston, Benj. R. Tucker.
Wellesley Prelude, The. Wellesley College. $2.00 per year.
WESLEYAN UNIVERSITY. Bulletin. November, 1891.
WHITE, ANDREW D. Instruction in Social Science.
YALE UNIVERSITY. Catalogue, 1890–91.
" " Preliminary Lists, October, 1891.